# PREDICTORS OF GRADE RETENTION AND SPECIAL EDUCATION PLACEMENT: IMPLICATIONS FOR IMPROVING EDUCATIONAL OUTCOMES IN THE STATE OF FLORIDA

By

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## LIST OF KEY TERMS

**Congenital anomaly:** An abnormality or disorder which is present at birth; birth defect (e.g., Down's Syndrome, cleft palate, congenital heart defect).

**Extremely low birth weight:** A birth weight of less than or equal to 1,000 grams or 2.2 pounds.

**Odds ratios:** The relative increase or decrease in the odds (i.e., probability that an event will occur divided by the probability it will not occur) of an outcome when one level of an explanatory variable is present as compared with another level of an explanatory variable (i.e., reference group).

**Logistic regression:** A form of statistical analysis which provides Information regarding the association between explanatory variables which are either categorical or continuous and a dichotomous outcome variable.

**Low birth weight:** A birth weight of less than or equal to 2,500 grams or 5.5 pounds.

**Model chi-square statistic:** Provides information about whether the overall model developed during logistic regression analysis is significant.

**Maternal race/ethnicity - Asian:** An individual indicated on birth certificate information as being of Asian ethnic background.

**Maternal race/ethnicity - black:** An individual indicated on birth certificate information as being of black racial background, and not being of Hispanic or Haitian ethnic background.

**Maternal race/ethnicity - black Hispanic:** An individual indicated on birth certificate information as being of black racial background, as well as being of Hispanic ethnic background.

**Maternal race/ethnicity - Haitian:** An individual indicated on birth certificate information as being of Haitian ethnic background.

**Maternal race/ethnicity - other Hispanic:** An individual indicated on birth certificate information as being of more than one racial background (e.g., black, white), as well as being of Hispanic ethnic background.

**Maternal race/ethnicity - White:** An individual indicated on birth certificate information as being of white racial background, and not being of Hispanic ethnic background.

**Maternal race/ethnicity - White Hispanic:** An individual indicated on birth certificate information as being of white racial background, as well as being of Hispanic ethnic background.

**Very low birth weight:** A birth weight of less than or equal to 1,500 grams or 3.3 pounds.

**Wald chi-square statistic:** Provides information about the overall effects of an explanatory variable and whether the effects are significantly different from zero.

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By

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Over recent years, improving the educational outcomes of students has been an important goal of the American educational system. To improve student outcomes, educational researchers have explored different avenues of research related to the issue. One avenue of research is the identification of predictors for educational outcomes. The current study provides a comprehensive examination of how biomedical, sociodemographic, and educational factors relate to two educational outcomes: grade retention and special education placement. To assess the impact of various factors on grade retention and special education placement, information on the aforementioned educational outcomes and on biomedical, sociodemographic, and educational factors was obtained from extant data sets for 123,940 children who were born in Florida and entered kindergarten in the state of Florida during the 1998-1999 school year.

Factors considered in the study were 1) mother's race, 2) mother's immigrant status, 3) mother's educational status, 4) mother's marital status, 5) mother's age, 6) Medicaid recipient during pregnancy, 7) child's sex, 8) child's birth weight, 9) congenital anomaly, 10) services received for developmental delay or disability, 11) age at kindergarten entry, 12) and limited English proficiency status. Logistic regression modeling was used to obtain adjusted odds ratios for each factor. Results indicated that approximately 30% of students in the study experienced grade retention and/or special education placement by second grade. All of the factors considered had a significant impact on early grade retention or special education placement. The following levels of the factors examined had the most powerful impact on grade retention: low maternal education, Medicaid recipient during pregnancy, male gender, low and extremely low birth weight, services received for developmental delay or disability from 3 to 5 years old, and younger age at kindergarten entry. Regarding special education placement, the following levels of the factors examined had the most powerful impact: male gender, extremely low birth weight, and services received for developmental delay or disability from birth to 3 years old, 3 to 5 years old, and birth to 5 years old.

# CHAPTER 1
# INTRODUCTION

A special meeting has been called, with the school principal, third-grade teachers, guidance counselor, and school psychologist participating. Results of this year's state standardized test are in: 38 of the school's third-graders did not meet state-specified standards, and as a result are candidates for mandatory grade retention. Many of these students were previously identified as having academic problems requiring special education services. During the meeting, some participants express frustration with the ever-increasing state academic standards; other participants express discouragement that more students did not meet standards, despite extensive preparation for the test. Still others ask how mandatory grade retention will benefit these children in the future. Participants at the meeting are determined to identify more effective ways to decrease the number of their students experiencing mandatory grade retention and needing special education services, with the ultimate goal of improving educational outcomes for these students.

While the above scenario describes the concerns of educators at the school level, this scenario is representative of the American public educational system at large. Specifically, a primary focus in American public education is to improve educational outcomes for all students. At a systems level, methods for improving educational outcomes have often taken the form of federal and state legislation (i.e., No Child Left Behind Act) and educational initiatives (i.e., school

grading) aimed at raising academic standards and increasing school accountability. Interest in improving student outcomes and identifying how to best meet students' needs in an era of increased accountability led educational researchers to examine various aspects of the issue.

One line of research on improving educational outcomes addresses the relationship of various risk factors to particular educational outcomes. Earlier studies showed that a variety of demographic, educational, and social factors (such as poverty, single-parent households, grade retention, self-esteem, and social skills) are related to educational outcomes in later elementary school and beyond (Astone & McLanahan, 1991; Eamon, 2002; Jimerson, Anderson, & Whipple, 2002; Juvonen, Nishina, & Graham, 2000; Malecki & Elliot, 2002; Pritchard & Wilson, 2003). For example, Jimerson, Egeland, Sroufe, and Carlson (2000) conducted a study of 177 students and their families to identify the correlates of dropping out during high school. Their study showed relationships among quality of early caregiving, early home environment, socioeconomic status, cognitive ability, behavior problems, academic achievement, peer relationships, parental involvement, and dropping out of high school. Existing studies, such as that conducted by Jimerson and colleagues (2000), of educational outcomes in the later elementary years and beyond, provide a valuable contribution to our understanding of educational development. However, the decreasing ages at which high-stakes standardized tests are being administered (and the resulting need for primary prevention of academic

problems) highlight the importance of understanding the contribution various factors make to educational outcomes in the early elementary years.

A number of studies have examined how various factors relate to early elementary outcomes. Previous studies evaluated the impact of a variety of predictors (such as health conditions, social and demographic characteristics, and educational practices) on outcomes such as grade retention, educational disabilities, and test scores (Byrd & Weitzman, 1994; Gueorguieva et al., 2001; Manset-Williamson, St. John, Hu, & Gordon, 2002). One of the more comprehensive is the Early Childhood Longitudinal Study (ECLS), a national study currently in progress (West, 2003). The ECLS provides descriptive data on children's educational development, and also examines relationships of various family, school community, and individual factors to a variety of educational outcomes. Research questions addressed by the study are being examined by following one cohort of 113,500 children from 9 months of age to the first grade; and another cohort of 22,000 children from kindergarten to the fifth grade. Initial findings showed that factors such as gender, student age, and maternal education were related to cognitive skills and knowledge in kindergarten (West, Denton, & Germino-Hausken, 2000; Zill & West, 2001). While much research has been conducted and is ongoing in this area, refinements to the existing research base can be made. Specifically, predictors previously not considered simultaneously should be explored in relationship to various educational outcomes. The relative importance of different factors in predicting educational outcomes also should be further examined.

Obtaining a more thorough understanding of the contribution of various factors to early elementary educational outcomes becomes especially important in a time of rising standards, accountability, and limited educational funding. Specifically, more precisely identifying the contribution various factors make to early elementary educational outcomes, may assist in identifying those children who may benefit most from prevention efforts provided before the years in which high-stakes standardized testing begins. A more current understanding of the variety of factors influencing educational outcomes may assist in identifying the types of services that should be part of prevention efforts. Knowing the magnitude of the contribution various factors make to educational outcomes may assist in prioritizing and developing prevention initiatives to help maximize use of the funding available for such efforts.

# CHAPTER 2
# REVIEW OF LITERATURE

To obtain an understanding of the current knowledge base related to predictors of early educational outcomes, literature related to the topic was reviewed. This literature review first provides an overview of the current trends in educational accountability and standards-based reform. Next, is a discussion related to the prevention of academic failure as it applies to issues of accountability and standards-based reform, and the effectiveness of the prevention of problematic outcomes through participation in early intervention programs. Then, a theoretical model of early development and risk factors and an approach to studying child development that is conducive to the creation of prevention initiatives (referred to as developmental epidemiology) is presented. Finally, the educational outcomes of retention and special education placement, including risk factors for such outcomes is discussed.

## Accountability and Standards-Based Reform

### Federal Trends

The last decade in education has been characterized by a variety of educational reform movements. The school accountability movement is one of many recent educational initiatives, bringing with it increased educational standards, high-stakes standardized testing, and consequences for individual students and schools tied to test results. In 2001, the No Child Left Behind Act (NCLB), a reauthorization of the Elementary and Secondary Education Act

(ESEA), was signed into law and represents a piece of federal legislation that has been central to the accountability movement (Linn, Baker, & Betebenner, 2002). The NCLB Act is aimed at increasing school accountability by mandating the development of content standards for Grades 3 through 8 in the areas of reading and math; and by creating yearly assessments to evaluate students' mastery of the content standards. Additionally, NCLB requires the participation of students in national assessments during Grades 4 and 8, and the creation of report cards to summarize the educational progress of students at state and school levels. The educational report cards are also being used to identify the educational progress of specific subpopulations of children (students who live in economically disadvantaged environments, have disabilities, or have limited English proficiency; or students from various racial/ethnic groups, or of male or female gender). Tracking the educational progress of students (through methods such as yearly assessments and report cards of progress) fulfills one purpose of the legislation, which is to ensure that children in schools with Title I funding meet educational progress standards that have been deemed "adequate." For those schools that have not achieved adequate progress in a year, various corrective actions (e.g., technical assistance to schools, restructuring traditional public schools into charter schools, public school choice options for students) have been outlined (Rudalevige, 2002; Wenning, Herdman, & Smith, 2002).

The NCLB legislation, with its various requirements, is applicable to states receiving Title I funding from the federal government. However, essentially all states receive Title I funding. Just before NCLB was signed into law,

approximately $9 billion was allocated to 90% of United States school districts as part of the Title I program (Irwin, 2002). Tying the large amount of funding associated with the Title I program to the rigorous requirements set forth by NCLB, significantly increased the focus on accountability at the state level.

**Florida Trends**

The state of Florida boasts a comprehensive system of accountability and standards-based reform, as a result of state legislation initiated before more recent federal legislation (i.e., NCLB). Florida's system of school accountability includes a variety of components aimed at enhancing student achievement (Florida Department of Education [FDOE], 2002a).

The cornerstone of Florida's school accountability system is a statewide standardized test, known as the Florida Comprehensive Assessment Test (FCAT). The FCAT is administered annually to students in grades 3 to 10, and was developed to assess students' mastery of state educational standards (referred to as the Sunshine State Standards) in the areas of reading, math, and writing; and the recently added area of science (FDOE, 2001).

A second component of Florida's accountability system that is influenced by student performance on the FCAT is school grading. The Florida school grading system provides information, in the form of letter grades, on how much progress students from the various schools in Florida make from year to year on the FCAT in the areas of reading, writing, and math (FDOE, 2002c).

Another component of Florida's accountability system that is linked to the FCAT (and perhaps of greatest concern to schools, students, and their families) is the imposition of high-stakes consequences for those schools and students

whose performance on the FCAT does not meet the academic standards outlined in the Sunshine State Standards. In particular, schools who do not perform up to par do not receive the monetary rewards given to schools that make expected progress (FDOE, 2003b). Florida legislation also mandates that students must demonstrate mastery of the Sunshine State Standards as measured by the FCAT in the tenth grade in order to receive a high school diploma (FDOE, 2001).

While the high-stakes consequences of Florida accountability legislation initially were enforced at the school level, and at the individual student level during the high school years, more recent legislation focuses on students in the early elementary years. Revisions to the Florida School Code during 2002 mandated identifying children with reading deficits in kindergarten through third grade, developing a plan for academic improvement, and providing intensive reading instruction. If after intensive reading instruction, third-grade students do not meet state reading standards as measured by the FCAT, they are required to be retained in the third grade, with few exceptions (i.e., good cause exemptions) outlined by the Florida School Code (FDOE, n.d.; Florida Senate, 2002). According to a Florida Department of Education third-grade reading profile report for the 2002-2003 academic year, 40,421 (21.1%) of Florida's third graders were candidates for grade retention. Of the 40,421 third-grade candidates for grade retention, 28,028 (14.6%) were actually retained in the third grade, and 12,403 (6.5%) were promoted with good cause exemptions (FDOE, 2003c).

**Preventing Academic Failure**

Improving students' educational outcomes has recently taken on the form of federal and state legislation targeted at increasing school accountability by increasing academic standards, using high-stakes standardized tests, reporting test results publicly, and enforcing corrective actions based on test results. While promoting positive educational outcomes has always been a primary goal of the educational system, the aforementioned components of recent accountability legislation significantly heighten the stakes for improving educational outcomes for schools, teachers, and students and their families. For example, students who do not pass state exams are in danger of grade retention or not graduating from high school. The observed increases in accountability and high-stakes decisions made under such systems further intensifies and highlights the need to prevent the academic failure of students, and intervene before academic problems develop.

A review of the literature showed a variety of strategies and programs developed to prevent the academic failure of children with academic problems (Cardona, 2002; Gredler, 1997; Hunt, Soto, Maier, & Doering, 2003; O'Connor & Simic, 2002; Shapiro, 1988). Waldron and McLeskey (2000) provided a comprehensive discussion of the variety of empirically-supported methods for preventing academic failure at the classroom and student level during the early school-age years. Examples of strategies and programs for preventing academic failure include teachers obtaining consultative support through problem-solving teams, making adaptations to the classroom curriculum, differentiating instruction, and providing intensive instruction to students with academic deficits.

In addition to providing services to prevent the academic failure of those children showing signs of academic difficulties, it is important that programs are developed to decrease the number of children at risk for academic problems and academic failure. This type of preventive intervention is referred to in the research literature as primary prevention. The main goal of primary prevention is to decrease the number of children experiencing a particular problematic outcome by intervening before the time when they become high risk for the outcome (Chamberlin, 1994). The main way this goal is achieved is by changing risk and protective factors that increase or decrease the potential that an individual will experience a particular outcome (Maggs & Schulenberg, 2001). To achieve the goal of primary prevention and increase positive outcomes, all stages of intervention development and implementation must be carried out correctly (Weissberg, Caplan, & Sivo, 1989 as cited in Weissberg & Bell, 1997). Specifically, the problem of interest must be clearly defined and understood, risk and protective factors clearly determined, and sequelae of the problem identified. Additionally, intervention efforts should be developed carefully based on knowledge about the problem and empirically-supported practices; and developed intervention should be implemented with integrity, and monitored for its effectiveness.

While discussions of primary prevention often aim to prevent the occurrence of an identified problem by modifying risk and protective factors, it is also important that preventive interventions include components that promote positive development of the target population (Lerner, 2001). This will enable

those individuals targeted by the intervention to avoid the identified problem, and also to become productive and successful in areas in which they were previously considered at risk. In preventing academic problems and failure, primary prevention programs should enable students to avoid the occurrence of academic problems and failure; and should also promote interest in learning, high academic self-concept, and engagement in enriching learning activities.

## Effectiveness of Early Intervention

Decreasing the number of children at-risk for academic problems and academic failure through preventative intervention would seem to be ideal. However, empirical evidence is needed to show the effectiveness of prevention programs. Many studies have evaluated the effectiveness of primary prevention of negative educational outcomes by examining early intervention programs. Such studies examined short- and long-term outcomes of early intervention for children and their families, and also examined the cost-effectiveness of early intervention (Campbell, Pungello, Miller-Johnson, Burchinal, & Ramey, 2001; Conyers, Reynolds, & Ou, 2003; Plecki, 1995; Ramey et al., 1992; Reynolds, Temple, Robertson, & Mann, 2002).

### Short- and Long-Term Outcomes

In general, studies of the efficacy of early intervention have supported the idea that such programs improve child outcomes for at-risk children (Casto & Mastropieri, 1986; Guralnick, 1997). Regarding the immediate benefits of early intervention, previous research shows that early intervention programs result in a variety of positive educational outcomes including increased cognitive ability, increased scores on achievement tests, and decreased placement in and time

spent in special education (Campbell & Ramey, 1994; Conyers et al., 2003; Gomby, Larner, Stevenson, Lewit, & Behrman, 1995; Gorey, 2001; Shonkoff & Phillips, 2000). Plecki's (1995) evaluation (of whether providing early intervention services to children with developmental delays led to a decreased need for special education services from kindergarten to the second grade) provides one example of the immediate benefits of early intervention. The infant intervention program, examined through Plecki's study, consisted of home visitation and center-based classroom services provided to children from birth to 3 years old. The home visitation component of the infant intervention program included parent training and services provided by an interdisciplinary group of professionals (e.g., special education teachers, physical therapists, speech therapists). The center-based classroom component took place for 3 hours a day, 5 days a week; and consisted of activities to promote child development, an interdisciplinary staff, and parent education. Findings of the study showed that early intervention services decreased the time spent in special education in the kindergarten through second grade, with earlier participation in early intervention significantly associated with decreases in the amount of time spent in special education.

In addition to examining the immediate outcomes of early intervention, research also has evaluated the long-term benefits. An early review of efficacy studies of early intervention (White & Casto, 1985) pointed to the scant evidence supporting the effectiveness of early intervention in producing long-term positive outcomes. However, more recent studies and reviews of research suggest that early intervention does sustain its effects over relatively long periods of time, with

participants experiencing increases in positive outcomes such as higher graduation rates, decreased rates of out-of-wedlock births, increased work earnings, decreased reliance on social services, and decreased juvenile arrests (Barnett, 1995; Gorey, 2001; Reynolds, Temple, Robertson, & Mann, 2001; Schweinhart, Barnes, & Weikart, 1993). In one study showing long-term benefits of early intervention, Campbell and colleagues (2001) examined the effects of a widely cited early intervention program (the Abecedarian Project) on the long-term cognitive and academic development of participating children who were from low-income, minority backgrounds. The Abecedarian Project was a center-based educational program provided for 8 hours a day, 5 days a week, with most of the children entering the program at approximately 4½ months old. The Abecedarian Project included a preschool and school-age component. The program offered low teacher-to-student ratios, and continuing professional development for teachers. At the preschool level, a set curriculum was followed, health and social services were offered, and parent education programs were provided. The school-age component provided a home-school resource teacher who served as a resource for additional instructional activities to meet the students' educational needs, an advocate for the child and parents, and liaison between the family and community services. Parent-training was also a part of the school-age component (Campbell et al., 2001; Campbell & Ramey, 1994). Children who participated in the Abecedarian Project generally obtained higher scores on cognitive and academic measures from ages 3 to 21 when compared

to a control group of children who received early care in different types of environments (Campbell et al., 2001).

**Cost-Effectiveness**

Studies of the short- and long-term benefits of early intervention are easily identified. Fewer studies have evaluated the cost-effectiveness of early intervention; of these studies, initial findings suggest that early intervention is a cost-effective method for addressing the educational needs of children (Barnett, 1993). For example, Reynolds and colleagues (2002) examined the cost-effectiveness of a federally-funded, school-based early intervention program (the Chicago Child-Parent Centers) that provided both educational and family support services to children (ages 3 years through 9 years) from low-income families. At the preschool level, the Chicago Child-Parent Centers provided structured educational services to children for a half day during each weekday. The preschool program also included health and nutritional services, low teacher-to-student ratios, teacher training, and parent involvement (e.g., parent training, and parent assistance with class activities). At the kindergarten and primary levels, the Chicago Child-Parent Centers consisted of health and nutrition services, structured activities to enhance educational development, small class sizes, and parent involvement (Conyers et al., 2003; Reynolds et al., 2002; Reynolds et al., 2001). They compared cost and benefits to the program participants with those for a group of children receiving either Head Start services or home-based care. The average cost of providing the early intervention program services per participant was $6,692. The cost-benefit analysis showed that by age 21, the initial investments made as part of the program generated a return of an average

of $47,759 per participant to society by increasing participants' financial independence; and decreasing costs for special education, grade retention, and consequences for criminal activities (Reynolds et al., 2002).

While early intervention programs generally produce positive educational, social, and financial benefits for participants and society, not all early intervention programs have been found to be effective. Barnett (1995) suggests that the lack of effectiveness of some programs may be due to the variations in quality and funding of some programs.

**Variations in Quality and Funding**

Discussions of the effectiveness of early intervention programs often accompany caveats regarding the quality of the program (Guralnick, 1997; McCollum, 2002). Some studies and discussions of early intervention, consider high program quality an important characteristic of effective early intervention programs (Bagnato, Suen, Brickley, Smith-Jones, & Dettore, 2002; Ramey, 1999). Furthermore, program quality has been found to influence the degree to which an early intervention program is associated with positive outcomes. Faddis, Ahrens-Gray, and Klein (2000) examined how program quality (as indicated by compliance with Head Start program performance standards) affects educational outcomes. They found that program quality was critical to the effectiveness of a preschool program. In particular, cognitive, social-emotional, and physical child outcomes were associated with program quality. In another study on the barriers to measuring the quality of early intervention services, Kontos and Diamond (2002) highlighted further evidence (Helburn, 1995; Kontos,

Howes, Galinsky & Shinn, 1994) supporting the idea that program quality strongly influences the effectiveness of early intervention.

One barrier to measuring quality of early intervention services is the many definitions (Gilliam & Lieter, 2003; Guralnick, 1997; Head Start Bureau, 2002) of quality:

- The nature of the relationship between families and service providers
- Service coordination
- Treatment integrity
- Degree of family centeredness
- The degree to which an early intervention program meets federal or professional association program standards

Quality likely has so many definitions because of the varied and individualized nature of the services provided by different early intervention programs.

Despite many definitions of program quality, characteristics representative of quality can be identified by examining the literature and previously described programs. The first such characteristic is comprehensiveness of services and service providers. Many exemplary programs (Campbell et al., 2001; Conyers et al., 2003; Plecki, 1995; Ramey et al., 1992) address more than one aspect of a child's development and may provide educational, health, nutritional, and social services to address the child and his or her family's needs. In addition, the presence and collaboration of an interdisciplinary group of service providers (e.g., special education teachers, pediatricians, speech therapists, physical therapists, occupational therapists) also is often found in model programs.

Another characteristic is structured (as opposed to unstructured) experiences. In reviewing studies on the efficacy of early intervention for at-risk children, White and Casto (1985) found that educational interventions identified as more structured were more effective than educational interventions identified as less structured.

Another characteristic is teacher training and a low teacher-to-student ratio (Campbell et al., 2001; Reynolds et al., 2001). Currie (2000) identified teacher-child interactions as the most critical component of quality. Furthermore, she said that effective teacher training and lower teacher-to-student ratios lead to more positive interactions between teacher and child.

A final characteristic is family involvement (Campbell et al., 2001; Conyers et al., 2003; Plecki, 1995; Ramey et al., 1992). Effective early intervention programs include parents in program board meetings, classroom activities, or parent support groups. Family involvement often includes increasing parent skills and coping strategies through individual parent training or educational workshops.

While the aforementioned characteristics help in describing high-quality programs, one obstacle to high-quality early intervention programs is the level of funding available for program implementation. Reviewing early intervention programs, Currie (2000) pointed to funding estimates showing that model early intervention programs cited in efficacy research (e.g., The Carolina Abecedarian Project, Perry Preschool Projects) generally have funding levels which are higher than larger-scale programs funded through public monies. While these funding

discrepancies clearly exist, the exact relationship between funding levels and the high quality of services that enhance educational outcomes is not as clear. There is an absence of studies that rigorously compare the effectiveness of large-scale early intervention programs (e.g., Head Start) funded at lower levels with the effectiveness of model early intervention programs (Currie, 2000, 2001; Haskins & Sawhill, 2003). This makes it difficult to draw any firm conclusions about the relationship between levels of funding and the implementation of high quality programs that lead to more positive educational outcomes.

**Conceptual Model of Early Development and Risk Factors**

An understanding of how risk factors may affect early development will assist in prevention initiatives, as well as aid researchers in determining what methods should be used when conducting research to identify specific risk factors. A number of theoretical models related to development have been proposed. Examples of such theories include: Brofenbrenner's (1979) ecological model, Sameroff's transactional model (Sameroff & Chandler, 1975; Sameroff & MacKenzie, 2003), and Ramey's biosocial model (Ramey et al., 1992). Guralnick (1997) integrated various aspects of existing theoretical models of development into one conceptual model of early development and risk factors. The purpose of this model is to assist in providing a framework for understanding the development of children from diverse backgrounds, and to provide guidance in the development of early intervention programs.

Guralnick's (1997) conceptual model of early development and risk factors posits that early development is affected by 3 major categories of factors: family and environmental characteristics, child disability or biological risk and related

stressors, and family patterns. The first category of family and environmental characteristics consists of factors such as parental educational level, mother's marital status, and family socioeconomic status. The second category related to child disability or risk relates to the effects of established childhood disabilities and biological conditions and the associated stressors experienced by the child and his or her family (e.g., resource and informational needs, family distress). The third category of family patterns encompasses the quality of the interactions between parent and child, the experiences a child has that have been organized by the family (e.g., educational activities, supports for disabilities), and the degree to which health and safety needs are met.

When looking at how these various categories of factors work to affect development, Guralnick (1997) proposes that family and environmental characteristics, as well as child disability and biological risk and their associated stressors impact family patterns. When family patterns are influenced in a positive or negative way by the aforementioned factors, child development is affected accordingly. For example, the presence of low maternal education may lead a mother to have to work multiple jobs with relatively low pay. As a result, a mother may have significantly limited time to spend with her child and may be tired when time is available to spend with her child. In addition, lower maternal education may lead to difficulty affording quality learning materials or additional learning experiences for her child, and a mother may experience more difficulty accessing quality health care for her child. In turn, a child may experience less than optimal development. Alternatively, the presence of high maternal education

may assist in promoting a child's optimal development through a mother's increased flexibility in time to be spent with her child, increased financial resources to buy quality learning materials and additional learning experiences, and easier access to high quality health care. While the presence of a factor such a low maternal education may impede development through various processes and the presence of a factor such a high maternal education may assist in promoting development in various ways, it should not be assumed that the presence of specific factors will necessarily lead to the interference with or promotion of optimal development. Strengths a child and his or her family may have in one area may moderate the negative factors present in another area.

An idea that cannot be overlooked when discussing theories of child development is related to Sameroff's idea regarding the transactional nature of child development. Specifically, when attempting to understand the process of child development, the role of the child and his or her characteristics cannot be examined without consideration of the environment and related experiences. Development occurs as a result of ongoing interactions between a child and his or her environment. Furthermore, the child does not solely influence the environment, nor does the environment solely influence the child – there is a bi-directional relationship between the two (Sameroff & MacKenzie, 2003). While considering the transactional nature of child development is important, Simmeonson (1994) indicates that it may not be feasible to incorporate the numerous factors and associated processes proposed by such models into prevention initiatives. For example, there are a considerable number of stressors

that an adverse health condition such as extremely low birth weight may present to a family. Different families may respond to different stressors related to extremely low birth weight in various ways, resulting in very different family-child interaction patterns, different organizations of the child's environment, as well as different experiences provided to the child. Children may respond to similar environments and similar experiences in different ways. Given this example, it can be seen that it would be overwhelming for prevention initiatives to incorporate the innumerable interactive processes that could potentially result from a single factor such as extremely low birth weight. Additionally, when considering Guralnick's model of early development and risk factors, it could be hypothesized that targeting interventions to address familial or environmental risk factors, or factors associated with child disability or biological risk, may assist in improving family patterns, and in turn may enhance a child's development.

**Developmental Epidemiological Approach**

As previously discussed, primary prevention efforts attempt to prevent the occurrence of a specific outcome by changing various risk and protective factors. Since the alteration of risk and protective factors serves as the backbone of prevention efforts, it is imperative that these factors be clearly identified through research. Maggs and Schulenberg (2001) have indicated that without the clear identification of the risk and protective factors, an understanding of factors that specifically increase or decrease an individual's risk are likely to remain unaddressed. As a result, continued and possibly increasing risk for the identified outcome will be experienced by the individual. For example, assume that living in poverty and the presence of a birth defect are risk factors which equally influence

a child's subsequent special education placement. However, only poverty has been clearly identified as a risk factor for the outcome. A child who possesses both of these risk factors but receives services to address his or her economic needs, while having his or her health needs unaddressed is likely to possess some continuing risk for special education placement as a result of the continuing influence of a birth defect.

One approach that often has been taken to study questions related to the development of prevention programs is an epidemiological approach. The goals of epidemiology consist of identifying the incidence, prevalence, and distribution of various conditions in the populations, as well as relating these types of information to different characteristics of an individual or their environment (Ahlbom & Norrell, 1990; Redden, Mulvihill, Wallander, & Hovinga, 2000). Taking an epidemiological approach to prevention research can assist in the identification of the specific risk factors that contribute to a particular problem, and also provides information about which children are at greatest risk for an outcome of interest (Simmeonson, 1994).

When an epidemiological approach is used to investigate questions regarding the relationship between specific outcomes and risk factors that are present in earlier periods of an individual's development, it is referred to as developmental epidemiology (Kellam & Langevin, 2003). Given the focus of developmental epidemiology on the early origins of later outcomes, researchers have cited the usefulness of the approach for studying the early risk factors for educational outcomes such as childhood disability (Mason, Chapman, & Scott,

1999; Redden et al., 2000). While the usefulness of the epidemiological approach for such research has been noted, relatively few published studies in the educational field have incorporated such an approach. Potential reasons for few studies incorporating such an approach can be identified through discussions in the research literature related to the application of a developmental epidemiological approach to studying educational outcomes.

A first potential reason cited by researchers for the lack of use of a developmental epidemiological approach to examine educational outcomes that can be identified is educational and developmental researchers' greater familiarity and experience with statistical methods typically used in traditional educational research as compared with developmental epidemiological approaches. Another potential reason for the few studies using a developmental epidemiological approach is the complex nature of many educational outcomes as compared to the outcomes with a distinct beginning and/or end often used in developmental epidemiological studies (e.g., death). For example, a student may have experienced an outcome at one point in time, but no longer experiences an outcome (e.g., received special education services and then no longer receives special education services) or a student may experience an outcome more than once during a his or her career (e.g., multiple grade retentions) (Mason, Scott, Chapman, & Tu, 2000).

The specific types of studies undertaken when assuming a developmental epidemiological approach to prevention research can be seen as falling into four categories: cross-sectional surveys, clinical or intervention trials, cohort studies,

and case-control studies (Redden et al., 2000). Cohort studies and case-control studies are best designed for the identification of the specific risk factors for a particular outcome, as well as for the identification of the magnitude of the effect of a risk factor on an outcome.

In cohort studies, groups of individuals are followed forward in time from risk exposure to outcome (i.e., prospective cohort studies) or retrospectively from outcome to risk exposure (i.e., retrospective cohort studies). By following individuals prospectively or retrospectively, the incidence of the specified outcome is determined, and then a comparison of the incidence of the outcome among those exposed and not exposed to a particular factor is made to assess risk. The ability to estimate incidence of an outcome in cohort studies is an advantage of the design. Additionally, by following individuals either prospectively or retrospectively through time, one develops a clear picture of the time relationship between risk exposure and the outcome of interest. Disadvantages of the cohort design include difficulty examining rare outcomes and lack of control over the quality of data in retrospective designs (Mason et al., 2000; Redden et al., 2000).

Case-control studies provide researchers the ability to evaluate the effects of multiple risk factors simultaneously by comparing groups of individuals who do (i.e., cases) and do not exhibit (i.e., controls) the outcome of interest and their previous exposure to potential risk factors. Frequently, in such studies, cases and controls are matched on a variety of potentially confounding factors to increase the homogeneity of the two groups. An advantage of case-control

studies is that they generally are time efficient in that the predictors and outcomes have already occurred. A second advantage is the ability to evaluate risk for uncommon outcomes. Some of the drawbacks that have been cited with regard to case-control studies include the lack of information about incidence of the outcome among various at-risk groups and the potential for selection or information bias depending on how the study data is collected (Mason et al., 2000; Redden et al., 2000).

Prior to any evaluation of risk factors for educational outcomes, the outcomes to be prevented should be clearly identified and described. Two outcomes experienced by a considerable portion of students in the American educational system are grade retention and special education placement. The paucity of research supporting the effectiveness of grade retention and special education placement as methods for addressing the needs of students exhibiting academic problems, as well as the lack of cost-effectiveness of such methods, highlight the importance of preventing these outcomes.

**Retention**

Historically, a variety of methods have been employed in response to students who do not make expected educational progress or meet identified academic standards. One method that has been commonly used and also widely researched is grade retention. Researchers recently have estimated that approximately 30 percent of students in the United States educational system have been held back at least one year by the time they enter high school (Thompson & Cunningham, 2000). In general, proponents of retention as a method for intervening with children experiencing academic problems, suggest

that the repetition of a grade provides students with the extra time and practice needed to improve and master academic skills that were incompletely learned or missed during the initial year in the grade (Combs, 1991 as cited in Tanner & Galis, 1997). With regard to the timing of the occurrence of retention, some propose that the repetition of a grade is more effective when it occurs early in a child's educational career because it is focused to intervene with a child prior to extended periods of school failure (Shepard, 1989).

While proponents purport that retention results in benefits for students, a large body of research on effectiveness generally does not support such assertions. In particular, research has found grade retention to be related to adverse outcomes such as increases in behavior problems, poorer social-emotional adjustment, and dropping out during high school (Byrd, Weitzman, & Auinger, 1997; Jimerson et al., 2002; Jimerson, Carlson, Rottert, Egeland, & Sroufe, 1997). Additionally, there is little evidence to support the idea that grade retention has lasting, positive effects (Jimerson et al., 1997). With regard to the issue of the timing of the retention, findings from research lend little support to the idea that early grade retention is effective in enhancing a student's academic development (Ferguson, Jimerson, & Dalton, 2001; Thompson & Cunningham, 2000). For example, West, Meek, and Hurst (2000) found significant differences on various teacher judgments of academic and behavioral functioning (e.g., disrupting the class, not learning up to potential) between children who did and did not repeat kindergarten, with those who had been retained identified as having more difficulties.

While a variety of studies have examined the consequences of early grade retention for students, less research has examined the predictors of early grade retention. Of those studies which have been conducted, biomedical and sociodemographic factors such as low birth weight, younger student age, male gender, and low maternal education have been found to be associated with early grade retention (Byrd & Weitzman, 1994; Cosden, Zimmer, & Tuss, 1993; Fowler & Cross, 1986; West et al., 2000). With regard to the effect of educational factors on early educational outcomes, relationships between factors such as school readiness, developmental delay, reading and language skills, social skills, and subsequent early grade retention have been noted (Agostin & Bain, 1997; Marcon, 1993; West et al., 2000). Previous studies conducted on the predictors of early grade retention have utilized research methods more traditionally found in educational studies, as well as developmental epidemiological research methods to identify risk factors. Studies employing research methods more traditionally used in education have commonly examined the relationship between demographic, educational factors or social factors and educational outcomes (Artiles, Aguirre-Muñoz, Abedi, 1998; Burchinal, Peisner-Feinberg, Pianta, & Howes, 2002; Malecki & Elliot, 2002; Scarborough, 1998). On the other hand, research on educational outcomes incorporating developmental epidemiological methodology more often have focused on biomedical and sociodemographic predictors (Avchen, Scott, & Mason, 2001; Johnson & Breslau, 2000; Schendel et al., 1997; Resnick et al., 1999).

Using research methods more traditionally used in education, Cosden and colleagues (1993) examined the factors of age, sex, and ethnicity and how they affected timing of kindergarten entry, as well as kindergarten retention. Their study gathered student demographic (e.g., gender, age, ethnicity) and educational information (e.g., reading achievement, school entry, retention); and information on school district characteristics (e.g., school district size, percentage of minority students, district socioeconomic status) for kindergarten students from three different school districts enrolling a total of almost 16,000 children. Findings from the study indicated a relationship between student age, sex, ethnicity and kindergarten retention. However, results also showed that characteristics of the different school districts mediated the relationship between the student factors and kindergarten retention.

Byrd and Weitzman (1994) conducted a national study which examined the relationship between a variety of health and social factors and retention in kindergarten or first grade using an epidemiological approach. In the study, parent interview data for 9996 children was analyzed to evaluate the relationship between the various factors and subsequent grade retention. Results of the initial bivariate statistical analysis showed 16 factors such as poverty, male gender, black race, low maternal education, low maternal age, deafness, speech defects, low birth weight, asthma, and exposure to household smoking to be associated with increased risk of retention in kindergarten and first grade. However, in the second analysis conducted as part of Byrd and Weitzman's study (1994), which examined the contribution of each factor to retention while controlling for all other

factors, the factors of black race, young maternal age, and asthma did not make a significant contribution to retention.

While the previously described studies have examined various biomedical and sociodemographic factors in relation to grade retention, a factor less often considered for its effects on grade retention is limited English proficiency. Although less often considered, a consistent increase in the number of students whose first language is not English has been observed (FDOE, 2002b; Nieto, 2000). The increasing number of students with limited English proficiency, along with the high-stakes of current accountability systems makes it critically important to understand the relationship between a child's language background and educational outcomes such as grade retention. While a recent state report (Texas Education Agency, 2002) has suggested that children with limited English proficiency are retained at higher rates than their peers whose first language is English, more research is needed to identify the nature of this relationship.

**Special Education Placement**

In the United States educational system, the term "special education" is used to refer to a variety of specialized services (e.g., instructional, social work, rehabilitative counseling) provided to students, ages 3-21, who have been identified as having a disability (Gale Encyclopedia of Childhood and Adolescence, 1998). To be eligible to receive special education services, children must be identified with a disability falling into one of 13 categories specified in federal legislation, known as the Individuals with Disabilities Education Act (IDEA). An additional requirement of eligibility to receive services is that the identified disability necessitates services provided through special education

(Jacob-Timm & Hartshorne, 1998). In addition to ensuring that children with disabilities receive specialized services, IDEA provides other guarantees to students with disabilities and their families. In particular, IDEA entitles children with disabilities to a free and appropriate public education in the least restrictive environment, and ensures students and their families the right to due process (National Association of School Psychologists [NASP], 2003a).

Since its inception, a continual and significant increase in the number of students receiving services under IDEA has been observed (Pruslow, 2001 as cited in Conyers et al., 2003). During the 2000-2001 academic year,11.5 percent of the total estimated student population in pre-kindergarten through the twelfth grade (approximately 5.8 million students) received some type of special education services under Part B of IDEA (United States Department of Education [USDOE], 2002). In the state of Florida, approximately 14.2% of students received such services during the same academic year (FDOE, 2003a). As can be seen from the aforementioned estimates, the number of children currently receiving special education services under IDEA is substantial. Along with the consistent growth and large numbers of students receiving special education services comes considerable costs. Specifically, recent estimates have shown that expenditures on special education total approximately $50 billion dollars a year. The cost of providing special education services to an individual student is approximately $8,080, with the total cost of educating a student identified with a disability totaling approximately $12,474 when general education services are added (Chambers, Parrish, & Harr, 2002).

The increasing number of students identified, the considerable costs associated with providing special education services, and the importance of effectively meeting the needs of students identified with disabilities has made it important to evaluate the efficacy of special education services. The results of various examinations of special education as it presently exists, has led some to question the efficacy of special education for students identified with disabilities. Specifically, some concerns that have been raised regarding the efficacy of special education services relate to the use of categorical eligibility, the lack of empirical support for the effectiveness of the "special" services provided through special education, and negative outcomes observed in students receiving special education services (Kavale & Forness, 1999; NASP, 2003b; Reschly, 1997; Reschly & Ysseldyke, 2002). .

Researchers have taken issue with the categorical approach to educational intervention that currently is commonly associated with special education, and propose that a noncategorical approach may be more effective in meeting students' educational needs (Reschly, 1997). One illustration of the problems related to the categorical approach often taken in special education relates to the delay in services observed in some categories due to the stringent eligibility criteria of categorical systems. Specifically, under a categorical system, eligibility to receive services for a specific learning disability often relies on a discrepancy model (Lyon, 1996). The difficulty with using a discrepancy model to identify children in need of educational services is that many children do not possess a large enough discrepancy to meet the eligibility criterion until the later

elementary years, after they have been experiencing difficulty for an extended period of time (Reschly, 2002). As a result, intervention becomes remedial rather than preventative, and thus more difficult. In addition to the aforementioned difficulty with categorical eligibility, it has been argued that there is poor reliability and a lack evidence for the usefulness of distinguishing between the various mild disability categories, and between some disability categories and groups of non-identified children such as low-achievers (NASP, 2003b; Reschly, 1996; Skrtic, 1991). Furthermore, some have asserted that categorical eligibility does not assist in developing, monitoring, or evaluating interventions, and focuses on a child's limitations rather than their competencies (Reschly, 1996; Reschly & Ysseldyke, 2002).

Although some suggest that movement towards a non-categorical system of eligibility would be best, others assert that labels, which are a part of a categorical system of eligibility, are important and helpful. Specifically, in their paper about what is right about special education, Hockenbury, Kauffman, and Hallahan (2000) indicate that labels are necessary to effectively communicate about students with special needs in that they provide information about the general characteristics particular students may possess and the specific needs they may have. Further, Hockenbury and colleagues reject the notion that labels are stigmatizing and instead propose that stigmas are present even before students with special needs are identified with a label.

In addition to some seeing a categorical approach to educational services as lacking effectiveness, some have expressed concerns over the lack of

empirical research supporting the efficacy of the "special" services provided to special education students. For example, in a meta-analytic review of six commonly used special education interventions (e.g., perceptual-motor training, modality training), Kavale and Forness (1999) found limited evidence for the effectiveness of the interventions in remediating the educational deficits displayed by students in special education. In addition to the aforementioned findings, if special education interventions are to be considered effective, one would expect that students identified with disabilities would eventually demonstrate achievement levels which are comparable to their peers without disabilities or at least the gap between the achievement levels of students with and without disabilities would begin to narrow. However, Trimble (1998 as cited in Bielinski & Ysseldyke, 2000) found a gap in the achievement levels of students with and without disabilities, with students identified with disabilities performing more poorly and the achievement gap consistently increasing throughout the school grades. Similar to Trimble's findings, results of the meta-analysis by Kavale and Forness (1999) revealed that interventions commonly used in special education do not have sufficiently large enough effect sizes to close the achievement gap between special and general education students.

While research generally has failed to support the effectiveness of interventions commonly used in special education, some have cautioned that firm conclusions cannot be made on presently available research (Hocutt, 1996; Terman, Larner, Stevenson, & Behrman, 1996; Zigmond, 2003). Specifically, it has been suggested that many presently available studies possess

methodological limitations, are outdated, and need to be interpreted by grouping students according to disability rather than as one group. Moreover, others have argued that special educators have developed strategies and instructional practices which are effective, however, it is the consistency and integrity with which these strategies and practices are implemented which is unclear and a potential concern (Browder & Cooper-Duffy, 2003; Landrum, Tankersley, & Kauffman, 2003).

Research related to the outcomes experienced by students placed in special education has raised considerable concern. Various studies and reviews of research have shown that special education students generally experience lower grades, higher rates of course failure, grade retention, high school dropout, and demonstrate less positive self-efficacy and lower expectations related to their future careers than their counterparts not in special education (Ochs & Rossler, 2001; Wood & Cronin, 1999). For example, in a review of research on the rates of high school dropout among students receiving special education services, Lichtenstein and Wiener (1988) found higher rates of dropout among special education students when compared to general education students. Rates of dropout of students receiving special education services from the various studies reviewed ranged from 19 to 57%.

An issue closely related to the lack of intervention effectiveness and problematic outcomes often experienced by students identified with disabilities is the issue of the disproportionate representation of minority and male students in special education. While some discussions related to disproportionate

representation primarily focus on the proportion of minority or male students placed in various special education categories, others have suggested that these type of discussions fail to address the major problem related to disproportionate representation. In particular, some have indicated that the major problem with disproportionate representation is that students who are identified receive potentially stigmatizing labels and receive services that lack empirical support for their effectiveness (Connor & Boskin, 2001; MacMillan & Reschly, 1998). Moreover, others have asserted that teachers often have inadequate training in addressing the needs of culturally diverse students identified with disabilities and typically are not representative of the diverse student population they teach (Gallegos & McCarthy, 2000; Ortiz, 2001). As a result, the disproportionate number of minority and male students placed in special education are unlikely to have their educational needs fully addressed.

In an attempt to better understand the etiology of educational disabilities, a variety of potential predictors have been examined in relation to the outcome. In particular, the association between various educational disabilities and factors such as pregnancy and birth conditions (i.e., labor/delivery complications, birth weight), health promoting or compromising behaviors (i.e., smoking during pregnancy, prenatal care), and differing social, demographic, and educational factors (i.e., poverty, sex, immigrant status, developmental delay) have been evaluated. Epidemiological methods, as well as methods consistent with more traditional educational research have been used to investigate such

relationships. From these investigations, a considerable number of factors have been found to be related to special education placement (Saigal, Rosenbaum, Szatmari, & Campbell, 1991).

Similar to the predictors of early grade retention, studies on the early predictors for special education placement in the early elementary years have shown both biomedical and sociodemographic factors such as low birth weight, male gender, poverty, and low maternal education to be associated with a greater risk with special education placement (Andrews, Goldberg, Wellen, Pittman, & Struening, 1995; Camp, Broman, Nichols, & Leff, 1998; Stanton-Chapman, Chapman, & Scott, 2001). Research conducted by Resnick and colleagues (1998) is one example of a study which simultaneously examined multiple potential biomedical and sociodemographic predictors of early special education placement. In particular, the authors of the study examined the impact of a variety of biomedical and sociodemographic factors on special education placement of children who had been hospitalized in neonatal intensive care units (NICUs) as an infant by linking the health and educational records of 24,698 children in the kindergarten through third-grade during the 1992-1993 academic year. When using logistic regression modeling which statistically adjusted for potentially confounding factors included in the model, the following factors were found to significantly increase a child's risk of being placed in special education: birth weight, transport to a government NICU following birth, congenital anomaly, receipt of ventilation at birth, child's sex, maternal marital status, maternal race, maternal educational level, and family economic status. Some differences in the

category of special education placement were noted based upon different risk factor categories (i.e., biomedical factors, sociodemographic factors). Specifically, results of the study showed that placement for a specific learning disability or educable mental handicap was associated with biomedical, as well as sociodemographic factors. In contrast, identification with an emotional handicap or speech and language impairment was primarily related to sociodemographic factors, while low incidence disabilities such as profound mental handicap or physical impairment was primarily associated with biomedical factors.

When attempting to identify other influential factors for children's educational outcomes such as early special education placement, the effects of factors such as teenage pregnancy also have been examined. In general, research has shown teenage pregnancy to have a negative impact on the cognitive and educational outcomes of children (Harvey & Spigner, 1995; Geronimus, Korenman, & Hillemeier, 1994). While some studies have found teenage pregnancy to be associated with negative educational outcomes, research has indicated other related factors that could account for the observed results (Gueorguieva et al., 2001). To address this question regarding the relationship between teenage pregnancy and adverse educational outcomes Gueorguieva and colleagues (2001) examined the association between teenage pregnancy and special education placement while controlling for potential confounding variables. Results of the study supported the idea that children of teenage mothers are at greater risk for identification with a disability in

kindergarten. However, the relationship between teenage pregnancy and special education identification was found to be due primarily to sociodemographic or environmental factors (e.g., low maternal education, single marital status, poverty, minority race). Therefore, the authors of this study suggested that it is the conditions that often co-occur with teenage pregnancy, such as low maternal education and poverty, that lead to problematic child outcomes, rather than teenage pregnancy itself.

In addition to examining the potential biomedical and sociodemographic contributors to special education placement, researchers have also examined the relationship between educational factors such as developmental delay or disability and subsequent identification for special education in the early elementary years. Findings from research conducted in this area has shown that a considerable portion of children who are identified with a developmental delay or disability continue to receive special education services upon their entry into elementary school. One study of two cohorts of children who had been identified with a developmental delay found that 74 percent of one cohort and 83 percent of the second cohort were identified and received special education services in the early elementary years (Bernheimer, Keogh, & Coots, 1993).

In light of concerns regarding the overrepresentation of racial/ethnic minorities in special education, researchers have taken risk factor research for special education placement a step further and have investigated whether predictors for special education placement vary as a function of race/ethnicity. While most of this research has focused on special education placement later in

childhood, initial findings of the few studies addressing this question have shown that risk factors for special education placement may vary as a function of race/ethnicity (Artiles et al., 1998). For example, research conducted by Mason and colleagues (1999) showed that while low maternal education, younger maternal age, and inadequate prenatal care had a significant impact on the identification of African American and White children as having a severe emotional disturbance or emotional handicap (SED/EH), these same factors were not predictive of identification with SED/EH for Hispanic students. Additionally, low maternal education, inadequate prenatal care, and single parenthood had a greater impact on White children's identification with SED/EH when compared to African American children.

Related to research regarding the risk of placement and resulting disproportionate representation of racial/ethnic minority groups in special education is research regarding the disproportionate representation of students with limited English proficiency in special education. As mentioned earlier, children with limited English proficiency comprise a group of students which has been consistently increasing in numbers in recent years (Langdon, Novak, & Quintanar, 2000). Along with observations of the growing numbers of students with limited English proficiency, are observations that these students are disproportionately represented in special education. Specifically, at national levels, Hispanic children, who make up a considerable portion of children with limited English proficiency, are underrepresented in the overall population of special education students. When looking at the representation of Hispanic

students in specific disability categories at the national level, some variation from the overall underrepresentation in special education has been noted. For example, Hispanic students have been found to be underrepresented in programs for students with educable mental handicaps, emotional disturbance, and other health impairments, but overrepresented and at greater risk for placement in programs for students with learning disabilities. In addition to these variations in representation at national levels, the degree and direction of disproportionate representation has been shown to vary state by state (Donovan & Cross, 2002; USDOE, 2002).

While existing research has helped to provide a beginning understanding of the relationship between cultural and linguistic diversity and special education, researchers in the field point out that the overall research base specifically related to issues of diversity and special education is small (McCray & Garcia, 2002). Additionally, the disproportionate representation of culturally and linguistically diverse students persists despite years of concern and recent research about the issue (Donovan & Cross, 2002). Taken together, these two points suggest that much more research is needed to fully understand the nature of the relationship between cultural and linguistic diversity and special education and to improve the educational outcomes of students who represent these groups.

## Problem Statement

Recall the school meeting described at the beginning of this chapter. On a state standardized test, 38 of a school's third-graders were candidates for

mandatory grade retention as a result of not meeting state specified standards in reading. The participants of the meeting were interested in identifying ways to improve the educational outcomes of their students, hoping to decrease the rates of grade retention and the number of children whose academic needs become so significant as to require special education services. From the literature previously reviewed, it can be argued that decreasing the rates of grade retention and special education placement experienced by students is an important goal and one that will result in many benefits to students, schools, and society. Specifically, grade retention and special education placement are costly, lack empirical support for their effectiveness, and are associated with a variety of problematic outcomes for students (Byrd et al., 1997, Chambers et al., 2002; Jimerson et al., 2002; Kavale & Forness, 1999; Ochs & Rossler, 2001; West et al., 2000). As a result, the primary prevention of grade retention and special education placement has the potential to decrease expenditures associated with providing these services, as well as improve academic and other life outcomes experienced by students.

With regard to methods for the primary prevention of grade retention and special education placement, early intervention programs provide a promising approach. Research reviewed with regard to the efficacy of early intervention suggests that quality programs are effective in preventing problematic outcomes and may lead to a variety of benefits for participants (Campbell et al., 2001;

Gorey, 2001; Guralnick, 1997; Plecki, 1995; Reynolds et al., 2001). Additionally, initial studies highlight the cost-effectiveness of early intervention programs (Barnett, 1993; Reynolds et al., 2002).

While a variety of early intervention programs have made a positive impact on many children's lives, many concerns related to the educational outcomes of American students remain. Specifically, large number of students are currently experiencing grade retention, state initiatives currently in place have the potential to increase grade retention, and significant and increasing numbers of students are receiving special education services. Taken together, these concerns suggest that improvements in existing early intervention programs can be made and new programs may be needed to make further progress toward the goal of improving students' educational outcomes. The refinement of existing early intervention programs and development of new programs to decrease children's likelihood of experiencing grade retention and special education placement should be grounded in current research and knowledge on the issue.

Yoshikawa (1995 as cited in Gomby et al., 1995) indicates that changes in the environments of America's children over the past 30 years have led to increases in the number of risk factors experienced by children, and early intervention programs need to be designed so as to provide services which address the various types of risk factors currently experienced by children. Taking this into consideration, it is important that the risk factors targeted by early intervention programs designed to improve educational outcomes be based upon

current investigations of potential biomedical, sociodemographic, educational risk factors, and the outcomes that result from early academic problems.

While various studies of early elementary educational outcomes have provided valuable insight to some of the risk factors for academic problems, there is a need for research which provides a more comprehensive consideration of potential risk factors using research methodology and design specifically developed for the identification of risk factors for outcomes of interest. In particular, although a few notable studies have simultaneously examined biomedical and sociodemographic factors in relation to academic outcomes (Byrd & Weitzman, 1994; Resnick et al., 1998; Stanton-Chapman et al., 2001), studies have yet to be conducted which simultaneously examine biomedical, sociodemographic, and educational predictors of educational outcomes.

To assist in more clearly identifying the risk factors for early grade retention and special education placement various biomedical, sociodemographic, and educational factors were studied in relation to grade retention and special education placement. In addition, the magnitude of the contribution each of the factors make to early grade retention and special education placement were examined. To study the relationship between the various risk factors and grade retention and special education placement, a developmental epidemiological approach was taken. The current study addressed the following questions:

- What is the independent contribution of various biomedical and sociodemographic factors to grade retention and special education placement by the 2nd grade?

- What is the independent contribution of receiving Early Intervention Program (EIP) services from birth to three years old and/or Pre-Kindergarten Children with Disabilities (PKCD) services from 3 to 5 years old for developmental delay or disability on subsequent retention and special education placement by the 2nd grade?

- What is the independent contribution of age at kindergarten entry to retention and special education placement by the 2nd grade?

- What is the independent contribution of limited English proficiency status (LEP) as indicated by services received for limited English proficiency to grade retention and special education placement by the 2nd grade?

# CHAPTER 3
# METHODOLOGY

## Participants

The health and educational records of 123,940 male and female children were examined as part of the study. The health and educational records included in the study were those of children born in the state of Florida between September 1, 1992 and August 31, 1993. These children entered kindergarten for the first time in Florida public schools during the 1998-1999 academic year, and entered the second grade during the 2000-2001 academic year. Children who were retained in either kindergarten or the first grade entered the second grade during the 2001-2002 academic year.

## Procedure

All data included as part of the study were collected from existing data sets. Study methodology, including the use of extant data sets, was similar to methodology used in studies conducted by Mason and colleagues (1999), Resnick and colleagues (1999), and Stanton-Chapman and colleagues (2001). Biomedical, sociodemographic, and Early Intervention Program data were obtained by collecting information from three data sets: Birth Vital Statistics (BVS) for 1992-1998 provided by the Florida Department of Health, Medicaid eligibility and enrollment data files for 1992-1998 provided by the Florida Agency

of Health Care Administration, and the Florida Department of Health's Children's Medical Services' (CMS) Early Intervention Program (EIP) database from 1996-1998.

Educational data were collected from the Maternal Child Health and Education Research and Data Center's (MCHERDC) educational data sets for 1997-2002 obtained from the Florida Department of Education. MCHERDC collects and maintains various maternal and child health and educational data sets, and is cooperatively operated by the Florida Department of Health, Florida Department of Education, Agency for Health Care Administration, the Lawton and Rhea Chiles Center for Healthy Mothers and Babies at the University of South Florida, and the College of Medicine at the University of Florida.

Following the collection of the aforementioned information from the various extant data sets, the information was merged to create a single record for each student included in the study. To arrive at the final sample for each model, those students who had information missing for any one of the variables included in the statistical models was excluded from the analysis.

## Measures

### Biomedical and Sociodemographic Factors

To assess the impact of various biomedical and sociodemographic factors on educational outcomes, information related to nine biomedical and sociodemographic factors was collected. The biomedical and sociodemographic factors suggested by previous research to impact early educational outcomes and included in the study were: maternal race/ethnicity, maternal immigrant status, maternal education, maternal marital status, maternal age, Medicaid

recipient status, child's sex, child's birth weight, and congenital anomaly (see List of Key Terms for definitions of various terms). The biomedical and sociodemographic information was evaluated using categorical measures of each factor. Table 3-1 shows each biomedical and sociodemographic factor and its corresponding levels.

Table 3-1. Biomedical and Sociodemographic Factors and Corresponding Levels.

| Variable | Levels |
|---|---|
| Mother's Race | Non-Hispanic Black, Non-Hispanic White*, Hispanic Black, Hispanic White, Hispanic Other, Haitian, Asian, |
| Mother's Immigrant Status | Non-US Born, US Born* |
| Mother's Education | <High School, High School, >High School* |
| Mother's Marital Status | Not Married, Married* |
| Mother's Age | <20, 20-29*, 30-34, >35 |
| Medicaid Recipient | Yes, No* |
| Infant's Sex | Male, Female* |
| Birth Weight | 450-749g, 750-999g, 1000-1499g, 1500-2499g, 2500-2999g, 3000-4749g*, 4750-6049g |
| Congenital Anomaly | Yes, No* |

*Reference Group

**Developmental Delay or Disability-Services Received**

The first of the different educational factors (Table 3-2) considered in the study was services received for developmental delay or disability. To evaluate the relationship between receiving services for developmental delay or disability and subsequent educational outcomes, children who received services through the Early Intervention Program (EIP) from birth to 3 years old or Prekindergarten Children with Disabilities (PKCD) program from 3 to 5 years old were identified. For each child identified as having received services for developmental delay or disability, three levels of received services were indicated. Specifically, whether a child received services from ages birth to 3 years old, 3 to 5 years old, or birth to

5 years old was determined and indicated. Following are descriptions of the EIP and PKCD programs.

**Early Intervention Program (EIP)**

The EIP consists of early intervention services provided under Part C of the Individuals with Disabilities Education Act (IDEA) to children from birth to 3 years of age and their families. Children who are eligible to receive EIP services demonstrate developmental delay or another condition which puts them at increased risk for developmental disability. Children can be identified with developmental delay in the following areas: cognition, physical/motor functioning, communication, social/emotional functioning, or adaptive behavior. Examples of established conditions that put children at increased risk for developmental delay, and fall under program eligibility criteria, include: genetic, metabolic, neurological, or severe attachment disorders; or sensory impairments (Thompson et al., 2003). EIP services are designed to decrease the occurrence of developmental delay, identify and provide the child and family with necessary supports, and increase readiness to start school (FICCIT, 2001). The EIP is the primary service provider addressing the needs of children with developmental delay or disability from birth to 3. As a result, for the study, children who received any EIP services at any point in time between the ages of birth to 3 were identified as receiving services for developmental delay or disability from birth to 3 years old.

**Prekindergarten Children with Disabilities (PKCD)**

The PKCD Program consists of services provided under Part B of IDEA to children from the ages of 3 to 5 years old who have a condition which interferes with normal development. Children eligible to receive services under Part B of

IDEA may demonstrate a developmental delay in the following areas: adaptive behavior, cognition, communication, social/emotional functioning, or physical development. Additionally, children who possess sensory or physical impairments, speech or language impairments, or a mental handicap are eligible to receive Part B services. PKCD services are designed to address a child's needs in cognitive, physical, social, communication, and adaptive behavior domains through the provision of needed supports to the child and his or her family (Florida Partnership for School Readiness, 2004; Florida State Board of Education [FSBOE], 2003). The PKCD Program is the primary service provider addressing the needs of children with developmental delay or disability between the ages of 3 to 5. To identify whether children had received PKCD services between the ages of 3 to 5, children who had a Department of Education classification code to receive PKCD services at any time between the ages of 3 to 5 were identified as receiving services for developmental delay or disability during this time period.

**Age at Kindergarten Entry**

To evaluate the impact that age at kindergarten entry may have on subsequent retention and special education placement, student age at kindergarten entry was ascertained. Student age at kindergarten entry was determined using the following formula, 9/1/1998 (date of kindergarten entry) – student date of birth / 365.25. The age variable was then converted to a dichotomous measure in which it was determined as to whether the child was 5.0 to 5.5 or 5.6 to 6.0 when entering kindergarten.

**Limited English Proficiency Status**

In the state of Florida, children whose native language is not English and whose English proficiency levels are below his or her grade level or peers are identified as having limited English proficiency and are provided language services based upon their level of proficiency in English, levels of academic achievement, and other educational needs (FSBOE, 2003). To determine the influence that limited English proficiency status may have on educational outcomes in the second grade, information was obtained on language services provided to individual children. All children who had received such services were identified as having limited English proficiency, and their limited English proficiency status was indicated by a dichotomous yes/no on the limited English proficiency status variable.

**Second-Grade Educational Outcomes**

To better understand how the previously described biomedical, sociodemographic, and educational factors were related to subsequent educational outcomes, information about two educational outcomes, grade retention and special education placement, that occur between school entry and the second grade year was collected for each child. Following is a brief description of each of the educational outcomes.

**Grade retention**

The grade retention variable is representative of whether a child was retained between school entry and the second grade. To determine whether a child was retained, information regarding his or her grade placement each year from kindergarten entry through the second grade was obtained.

**Special education placement**

Special education placement refers to whether a child has been identified as receiving services that fall under any one of the exceptional student education categories found in the Florida State Board of Education Administrative rules (FSBOE, 2003). Due to changes in primary exceptionality status in the kindergarten through second grades for some students, special education placement was evaluated through the use of a dichotomous measure (i.e., yes/no) of receipt of special education services in the kindergarten, first, or second grade. The special education placement variable was evaluated as a dichotomous measure rather than evaluated by various disability categories due to insufficient sample size.

Table 3-2. Educational Factors and Corresponding Levels

| Variable | Levels |
|---|---|
| Developmental Delay or Disability-Services Received | Birth to 3 years, 3 to 5 years, Birth to 5 years, None* |
| Age at Kindergarten Entry | 5.0-5.5, 5.6-6.0* |
| Limited English Proficiency Status | Yes, No* |
| Grade Retention | Yes, No* |
| Special Education Placement | Yes, No* |

*Reference Group

## Statistical Analysis

Categorical modeling procedures were used to examine each of the questions addressed by the study. Specifically, logistic regression modeling (Menard, 2002; Peng, Lee, & Ingersoll, 2002) was used to evaluate the concurrent effects of the explanatory variables on each outcome variable (see List of Key Terms for definitions of various terms). A stepwise procedure was used to create each regression model. During the stepwise procedure, a significance level of .1 was maintained for the score chi-square as each

explanatory variable was entered into the model. Additionally, a significance level of .1 had to be maintained for the Wald chi-square for each explanatory variable to remain in the model following the addition of other explanatory variables. If an explanatory variable did not meet the aforementioned significance level criteria, it was not included in the model. For each of the models developed, a main effects model was assumed and fitted.

Each of the logistic regression models provided chi-square tests of the overall model fit and measures of the overall significance of each of the factors included in each model. Additionally, adjusted odds ratios (Mason et al., 2000) and associated confidence intervals were derived to provide information about effects that each level of each of the factors had on second-grade educational outcomes. When deriving adjusted odds ratios, the level of each explanatory factor judged to have the smallest association with the outcome variables served as the reference category. In addition, the adjusted odds ratios were calculated while controlling for all other variables included in the model. Odds ratios that were greater than one signified that the level of the factor being examined was associated with a greater likelihood of the occurrence of the second grade educational outcome of interest, while odds ratios that were less than one represented that the level of the factor being examined exerted a protective effect for the particular educational outcome of interest. The confidence interval associated with each adjusted odds ratio provided information about the significance of the effect of each factor. Confidence intervals were constructed to test the effect of each factor at the .05 significance level.

For the first model developed as part of the study, the aforementioned sociodemographic, biomedical, and educational variables (i.e., developmental delay or disability-services received, limited English proficiency status) served as the explanatory variables while grade retention in kindergarten, first, or second grade served as the outcome variable. The model examined the association between the explanatory variables and retention only using records of students born in the state of Florida. To examine the educational outcome of special education placement, a second model was developed using a similar method but using special education placement in kindergarten, first, or second grade as the outcome variable. To further examine the effects that various biomedical, sociodemographic, and educational factors have on second grade educational outcomes, a third model was developed. The third model evaluated the outcomes of special education placement and grade retention simultaneously. In particular, the effects that the previously described explanatory variables had on whether a child experiences grade retention and/or special education placement in kindergarten through second grades were examined. The value of examining grade retention and special education placement as a single outcome in the third model, includes the ability to identify the different distributions of students who experience at least one of the adverse educational outcomes, as well as the ability to further examine the magnitude and direction of the effects of particular variables.

# CHAPTER 4
# RESULTS

## Sample Description

The data included in the study were collected from extant data sets. The merging of the various data sets and exclusion of student records with data missing for any variable resulted in a final sample of 123,940 student records for each model. For the overall final sample, 15.01% of students were retained in kindergarten, first, or second grade, while 21.59% received special education services in kindergarten, first, or second grade. Additionally, with regard to the percentage of students who experienced grade retention and/or special education placement, 31.40% of students experienced either one or both of these educational outcomes in kindergarten through second grades. Sample descriptive statistics for the explanatory factors included in each of the models are shown in Table 4-1.

To evaluate the degree to which the study sample is representative of the state demographics for the time period studied, various comparisons of sample demographics were made in relation to Florida Birth Vital Statistics (BVS) data. It should be noted, that the study sample was merged based upon the academic year (i.e., from September to August) while Florida BVS data is collected based upon birth year (i.e., from January to December). As a result, children included in the study sample were born in either the 1992 or 1993 BVS birth years. To make more accurate comparisons between study sample demographics and BVS data

demographics, BVS data for the two birth years (i.e., 1992 and 1993) was averaged and used for comparisons (Florida Department of Health, 2004).

A first comparison of the average number of live births for 1992 and 1993 was made to the final number of student records included in the study sample. The average number of live births for 1992 and 1993 was 191,992 births, while the final number of student records included in the study sample was 123,940. Comparisons of these numbers show that approximately 65% of children born during the time period evaluated in the study were included in the final study sample (Florida Department of Health, 2004).

In addition to the comparison made with regard to the overall sample, some other comparisons were made related to specific demographic variables. Comparisons of all variables included in the study were not made due to the lack of availability of some variables and different subgroupings of some variables in the BVS data reports. An evaluation of the study descriptive statistics of some of the specific levels of various variables were found to be comparable to BVS data. For example, approximately 27% of the mothers in the study had less than a high school education, while BVS data showed approximately 24% of mothers giving birth during that same time period having less than a high school education. Other levels of study variables for which BVS data was available and had demographic estimates relatively representative of BVS data included: marital status, maternal age, and low birth weight categories. One study variable found to be inconsistent with BVS data was Medicaid recipient during pregnancy which served as an indicator of poverty status. Study descriptive statistics show 49% of

the sample to demonstrate poverty status, while BVS data shows that families with related children under the age of 5 receiving Medicaid comprised approximately 18% of the population during 1992 and 1993. This comparison shows that the study sample is overrepresented in relation to those children of families living in poverty. It should be noted that there are more lenient income eligibility requirements for pregnant women to receive Medicaid (the measure of poverty status in the current study) in comparison to the income eligibility requirements for families with related children under the age of 5 to receive Medicaid. As a result, the greater percentage of Medicaid recipients in the current study as compared to the available BVS data, may partially be a reflection of differing income eligibility requirements (Florida Department of Children and Families, 2003). Additionally, since the variable for poverty status in the current study only has two levels, a sufficiently large number of non-poverty students were included as part of the study (Florida Department of Health, 2004). Finally, comparisons of study sample demographics and BVS data in relation to the different racial/ethnic categories were unable to be made due to differing methods of subgrouping individuals from various racial/ethnic backgrounds.

A review of the descriptive statistics shows some noteworthy findings. First, differential patterns of grade retention or special education placement were observed among various subgroups of children. In particular, with regard to grade retention and special education placement patterns among students of various racial/ethnic backgrounds, all racial/ethnic subgroups had a greater percentage of their subgroups experiencing special education placement as

compared to grade retention, with the exception of black and Haitian students. Black and Haitian students had similar percentages of their subgroups of students experiencing grade retention as compared with special education placement. A similar pattern of differential educational outcomes was observed for the factors of maternal education and maternal age, with students of mothers with less than a high school education or less than 20 years old experiencing greater percentages of grade retention than special education placement. All other subgroups for the factors of maternal education and maternal age experienced special education placement more often than grade retention. Additionally, with regard to the factors of maternal education and maternal age, the percentage of students experiencing grade retention decreased as maternal education and maternal age increased, while the percentage of students placed in special education increased as maternal education and maternal age increased.

Other noteworthy findings of the descriptive statistics include the observation that the percentage of grade retention and special education placement increased as birth weight decreased, with approximately 66% of the smallest of babies experiencing either grade retention and/or special education placement. In addition to the previous finding, a large difference in the percentage of students retained was found among children whose mothers did and did not receive Medicaid. Specifically, children of mothers who received Medicaid experienced a 13% greater occurrence of grade retention when compared with children of mothers who did not receive Medicaid. In terms of

special education placement, children of women who did and did not receive Medicaid showed similar percentages of special education placement. Finally, the highest percentages of students experiencing grade retention and/or special education placement were found in those subgroups of children who received services for developmental delay or disability from birth to 5 years old or 3 to 5 years old.

## Model 1: Grade Retention

### Analysis of Overall Model

Grade retention at any time in the kindergarten, first, or second grades served as the outcome variable for the first logistic regression model developed. When using the stepwise procedure to develop the model, all biomedical, sociodemographic, and educational variables entered into the model were found to maintain criteria set for model development. Following the development of the model, the analysis of the overall model fit showed that the overall model was significant at the <.0001 level as measured by the Model chi-square statistic.

### Analysis of Main Effects

An evaluation of the overall effects of each of the biomedical, sociodemographic, and educational variables was conducted for the educational outcome of grade retention. Results of the analysis of the overall effects of each of the factors on grade retention, as indicated by Wald chi-square statistics, showed that all factors examined had significant effects on grade retention at the <.01 significance level. Results of the overall effects for each factor are presented in Table 4-2.

Odds ratios and confidence intervals were derived to ascertain the effects that various levels of each factor had on grade retention (Table 4-3). Many levels of the different factors were observed to exert a significant effect on grade retention. Since many levels of the different factors were found to have significant effects on grade retention as well as the other outcomes examined, some criteria was needed to identify those levels of factors which had the most powerful significant effects on the educational outcomes examined. To assist in identifying and describing those explanatory factors which exerted the most powerful significant effects, the levels of the factors which reached significance and also had an odds ratio of above 1.5 or below .5 were considered to have effects of substantial magnitude. Those levels of factors which reached significance and had an odds ratio that was above 1.5 were considered as placing a student at a significant and substantial risk for the outcome examined. In contrast, those levels of factors which reached significance and had odds ratios that were below .5 were considered as exerting significant and substantial protective effects for the outcome examined.

Using the aforementioned criteria, certain levels of some factors were found to exert a significant protective effect for early grade retention. Although certain levels of some factors (i.e., maternal race/ethnicity, maternal age, limited English proficiency status) had significant protective effects on grade retention, as well as the outcomes (i.e., special education placement, grade retention and/or special

education placement) examined in subsequent models, the magnitude of the protective effects were not substantial with the exception of one case found in the second model.

In contrast to the smaller magnitudes of the protective effects, various levels of different factors were found to put students at significantly greater risk for early grade retention, with some effects being of considerable magnitude. In particular, maternal education was found to have a substantial impact on grade retention, with students of mothers with less than a high school education being 3.30 times more likely to experience grade retention than students with mothers with beyond a high school education. In addition, students of mothers with equal to a high school education were shown to be almost two times more likely than students with mothers with beyond a high school education to be retained in the kindergarten, first, or, second grades. Next, students born in the extremely low birth weight (i.e., 0-749 grams, 750-999 grams) also were found to be 2 times more likely to experience grade retention than children born of normal birth weight. Further, one birth weight category found to put children at a 1.5 times greater likelihood of grade retention than their normal birth weight peers were those children born of low birth weight (i.e., 1500-2499 grams). While not meeting the outlined criteria for being considered as having a substantial effect on grade retention, it is also important to note that children born of very low birth weight also were at significantly greater odds (i.e., approximately 1.4 times as likely) of being retained. With regard to the effect of student age, children who were younger at kindergarten entry (i.e., 5.0-5.5 years old) were found to be

almost 2 times as likely as children older at kindergarten entry (i.e., 5.6-6.0 years old) to experience early grade retention. Finally, children who had mothers who received Medicaid, children who were male, or children who received services for developmental delay or disability from 3 to 5 years old were all found to be approximately 1.6 to 1.7 times more likely to be retained in kindergarten, first, or second grade.

## Model 2: Special Education Placement

### Analysis of Overall Model

For the second model developed as part of the study, special education placement in kindergarten, first, or second grade served as the outcome variable. When developing the regression model using the stepwise procedure, all biomedical, sociodemographic, and educational factors maintained the specified criteria to remain in the model with the exception of maternal marital status. As a result, maternal marital status was not included as part of the model. The test of the overall model fit, indicated that according to the Model chi-square statistic, the overall model was significant at the <.0001 level.

### Analysis of Main Effects

The Wald chi-square statistics used to examine the overall effects of the factors included in the second model on special education placement are presented in Table 4-2. All factors included in the model had a significant effect on special education placement at the <.01 significance level.

Those factors which put children at a significantly greater risk for special education placement in the early elementary years, and were of a substantial

magnitude as indicated by the adjusted odds ratios and associated confidence intervals (Table 4-3) included: receiving early childhood services for developmental delay or disability, birth weight, and gender. Children who received early intervention services for developmental delay or disability experienced the greatest likelihood of special education placement in kindergarten, first, or second grade. More specifically, children who received services from birth to 5 years old or 3 to 5 years old were 42-44 times more likely to experience special education placement than student who did not receive such services, while students who received services for developmental delay or disability from birth to age 3 were almost 2 times more likely to experience the outcome of special education placement. Similar to the latter category of services received for developmental delay or disability, children born in an extremely low birth weight category (i.e., 0-749 grams) and male children were found to be about 2 times as likely as their normal birth weight peers and as females, respectively, to experience special education placement in kindergarten, first, or second grade.

For the outcome of special education placement, one level of one factor was found to be associated with a significant and substantial protective effect. Students whose racial/ethnic category was identified as other Hispanic were about half as likely as White students to be identified to receive special education services.

### Model 3: Grade Retention and/or Special Education Placement

#### Analysis of Overall Model

For the third model developed as part of the study, grade retention and/or special education placement in kindergarten, first, or second grade served as the outcome variable. When developing the regression model using the stepwise procedure, all biomedical, sociodemographic, and educational factors with the exception of one maintained the specified .1 significance level to enter the model and .1 significance level to remain in the model. The variable which did not meet the specified significance level criteria to be included in the model was the limited English proficiency status variable. Specifically, limited English proficiency status did not reach the .1 significance level set for a variable to be entered into a model. The lack of significance of limited English proficiency status in this third model combining the outcomes of grade retention and special education placement likely was due to the inverse effect the variable had on grade retention and special education placement as identified in the first two models. In particular, being identified as having limited English proficiency, exerted a significant risk effect on grade retention, while showing a significant protective effect on special education placement, thus resulting in a non-significant effect of the variable when the two outcomes were combined into a single outcome. Since the variable of limited English proficiency status did not meet the specified entry criterion, it was excluded from the third model. The resulting test of the overall model fit of the model developed, indicated that according to the Model chi-square statistic, the overall model was significant at the <.0001 level.

**Analysis of Main Effects**

Findings related to the overall effects of the examined factors on grade retention and/or special education placement are shown in Table 4-2. All biomedical, sociodemographic, and educational factors had significant effects on grade retention and/or special education placement at the <.01 significance level.

Findings of the final model were similar to previous models (Table 4-3). In particular, children who received services for developmental delay or disability, children born of low birth weight, children of male gender, and children with mothers with less than a high school education were shown to be at a significant and substantially greater likelihood of experiencing the outcomes of early grade retention and/or special education placement. Children who received services for developmental delay or disability from birth to 5 years old or from 3 to 5 years old were about 27 times more likely to experience an adverse educational outcome when compared with students not receiving such services, while children who received services for developmental delay or disability from birth to 3 years old were about 1.5 times more likely to experience an adverse educational outcome. Additionally, children who were born in extremely low birth weight categories (i.e., 0 to 749g, 750 to 999g) were shown to be 1.5 to 2.5 times more likely to experience grade retention and/or special education placement, while male children and children with mothers with less than an high school education were found to experience a 2 time greater likelihood of grade retention and/or special education placement than female children or children of mothers with greater than a high school education.

Table 4-1. Descriptive Statistics - Grade Retention, Special Education Placement, and Grade Retention and/or Special Education Placement (n=123,940)

| Variables | Number[a] | Percent[a] | Number Retained[b] | Percent Retained[b] | Number Special Education[b] | Percent Special Education[b] | Number Retained or Special Education[b] | Percent Retained or Special Education[b] |
|---|---|---|---|---|---|---|---|---|
| Total Study Sample | 123,940 | 100 | 18,605 | 15.01 | 26,754 | 21.59 | 38,915 | 31.40 |
| Maternal Race/Ethnicity | | | | | | | | |
| Black | 30,404 | 24.53 | 6,490 | 21.35 | 6,312 | 20.76 | 10,780 | 35.46 |
| White | 68,392 | 55.18 | 9,047 | 13.23 | 15,955 | 23.33 | 21,379 | 31.26 |
| Black Hispanic | 653 | .53 | 83 | 12.71 | 122 | 18.68 | 177 | 27.11 |
| White Hispanic | 19,586 | 15.80 | 2,460 | 12.56 | 3,957 | 18.37 | 5,406 | 27.60 |
| Other Hispanic | 124 | .10 | 10 | 8.07 | 15 | 12.10 | 24 | 19.36 |
| Haitian | 2,993 | 2.41 | 384 | 12.83 | 416 | 13.90 | 727 | 24.29 |
| Asian | 1,788 | 1.44 | 131 | 7.32 | 337 | 18.85 | 422 | 23.60 |
| Maternal Immigrant Status | | | | | | | | |
| Non-US Born | 24,019 | 19.38 | 2,595 | 10.80 | 4,192 | 17.45 | 6,130 | 25.52 |
| US Born | 99,921 | 80.62 | 16,010 | 16.02 | 22,562 | 22.58 | 32,785 | 32.81 |
| Maternal Education | | | | | | | | |
| Less than High School | 33,457 | 26.99 | 8,508 | 25.43 | 7,346 | 21.96 | 13,126 | 39.23 |
| High School | 50,630 | 40.85 | 7,284 | 14.39 | 10,397 | 20.54 | 15,095 | 29.81 |
| Greater than High School | 39,853 | 32.16 | 2,813 | 7.06 | 9,011 | 22.61 | 10,694 | 26.83 |
| Maternal Marital Status | | | | | | | | |
| Single | 47,703 | 38.49 | 10,037 | 21.04 | 10,032 | 21.03 | 16,854 | 35.33 |
| Married | 76,237 | 61.51 | 8,568 | 11.24 | 16,722 | 21.93 | 22,061 | 28.94 |
| Maternal Age | | | | | | | | |
| Less than 20 years | 18,843 | 15.20 | 4,305 | 22.85 | 3,810 | 20.22 | 6,800 | 36.09 |
| 20-29 years | 67,849 | 54.74 | 10,349 | 15.25 | 14,319 | 21.10 | 21,017 | 30.98 |
| 30-35 years | 25,269 | 20.39 | 2,767 | 10.95 | 5,765 | 22.82 | 7,522 | 29.77 |
| Greater than 35 years | 11,979 | 9.67 | 1,184 | 9.88 | 2,860 | 23.87 | 3,576 | 29.85 |
| Medicaid Recipient | | | | | | | | |
| Yes | 60,877 | 49.12 | 13,100 | 21.52 | 13,316 | 21.87 | 22,052 | 36.22 |
| No | 63,063 | 50.88 | 5,505 | 8.73 | 13,438 | 21.31 | 16,863 | 26.74 |

[a]Number or percentage of students falling into a particular subgroup. Percentages were calculated using the following formula: number of students in subgroup / total study sample.

[b]Number or percentage of students of a particular subgroup experiencing the identified educational outcome(s). Percentages were calculated using the following formula: number of students experiencing the educational outcome / number of students in subgroup.

Table 4-1. Continued.

| Variables | Number[a] | Percent[a] | Number Retained[b] | Percent Retained[b] | Number Special Education[b] | Percent Special Education[b] | Number Retained or Special Education[b] | Percent Retained or Special Education[b] |
|---|---|---|---|---|---|---|---|---|
| Child's Sex | | | | | | | | |
| Male | 64,012 | 51.65 | 11,559 | 18.06 | 17,161 | 26.81 | 24,243 | 37.87 |
| Female | 59,928 | 48.35 | 7,046 | 11.76 | 9,593 | 16.01 | 14,672 | 24.48 |
| Birth Weight | | | | | | | | |
| 0-749 grams | 172 | .14 | 46 | 26.74 | 98 | 56.98 | 114 | 66.28 |
| 750-999 grams | 301 | .24 | 80 | 26.58 | 138 | 45.85 | 176 | 58.47 |
| 1000-1499 grams | 819 | .66 | 181 | 22.10 | 286 | 34.92 | 378 | 46.15 |
| 1500-2499 grams | 7,799 | 6.29 | 1,738 | 22.29 | 1,991 | 25.53 | 3,073 | 39.40 |
| 2500-2999 grams | 21,525 | 17.37 | 3,822 | 17.76 | 4,511 | 20.96 | 7,061 | 32.80 |
| 3000-4749 grams | 92,677 | 74.78 | 12,657 | 13.66 | 19,557 | 21.10 | 27,889 | 30.10 |
| Greater than 4750 grams | 647 | .52 | 81 | 12.52 | 173 | 26.74 | 224 | 34.62 |
| Congenital Anomaly | | | | | | | | |
| Yes | 1,280 | 1.03 | 251 | 19.61 | 447 | 34.92 | 579 | 45.23 |
| No | 122,660 | 98.97 | 18,354 | 14.96 | 26,307 | 21.45 | 38,336 | 31.25 |
| Developmental Delay or Disability – Services Received | | | | | | | | |
| 0-3 years | 1,643 | 1.33 | 392 | 23.86 | 470 | 28.61 | 709 | 43.15 |
| 3-5 years | 6,732 | 5.43 | 1,591 | 23.63 | 6,060 | 90.02 | 6,155 | 91.43 |
| 0-5 years | 1,453 | 1.17 | 292 | 20.10 | 1,314 | 90.43 | 1,332 | 91.67 |
| None | 114,112 | 92.07 | 16,330 | 14.31 | 18,910 | 16.57 | 30,719 | 26.92 |
| Child's Age at Kindergarten Entry | | | | | | | | |
| 5.0-5.5 years old | 61,060 | 49.27 | 11,543 | 18.90 | 13,502 | 22.11 | 21,039 | 34.46 |
| 5.6-6.0 years old | 62,880 | 50.73 | 7,062 | 11.23 | 13,252 | 21.08 | 17,876 | 28.43 |
| Limited English Proficiency Status | | | | | | | | |
| Yes | 15,028 | 12.13 | 2,231 | 14.85 | 2,586 | 17.21 | 4,276 | 28.45 |
| No | 108,912 | 87.87 | 16,374 | 15.03 | 24,168 | 22.19 | 34,639 | 31.81 |

[a]Number or percentage of students falling into a particular subgroup. Percentages were calculated using the following formula: number of students in subgroup / total study sample.

[b]Number or percentage of students of a particular subgroup experiencing the identified educational outcome(s). Percentages were calculated using the following formula: number of students experiencing the educational outcome / number of students in subgroup.

Table 4-2. Overall Effects and Significance Levels for Biomedical, Sociodemographic, and Educational Factors - Grade Retention, Special Education Placement, and Grade Retention and/or Special Education Placement

| | Grade Retention | | Special Education | | Grade Retention and/or Special Education | |
|---|---|---|---|---|---|---|
| Factor | Wald Chi-Square Statistic | Significance Level | Wald Chi-Square Statistic | Significance Level | Wald Chi-Square Statistic | Significance Level |
| Maternal Race/Ethnicity | 138.59 | <.0001* | 172.65 | <.0001* | 73.14 | <.0001* |
| Maternal Immigrant Status | 148.30 | <.0001* | 27.85 | <.0001* | 116.77 | <.0001* |
| Maternal Education | 1972.80 | <.0001* | 67.48 | <.0001* | 776.47 | <.0001* |
| Maternal Marital Status | 19.83 | <.0001* | ** | ** | 6.70 | .0096* |
| Maternal Age | 38.85 | <.0001* | 111.71 | <.0001* | 68.95 | <.0001* |
| Medicaid Recipient | 697.29 | <.0001* | 11.88 | .0006* | 279.30 | <.0001* |
| Child's Sex | 1049.96 | <.0001* | 1293.69 | <.0001* | 1933.70 | <.0001* |
| Birth Weight | 281.24 | <.0001* | 40.88 | <.0001* | 160.74 | <.0001* |
| Congenital Anomaly | 9.07 | .0026* | 20.02 | <.0001* | 20.50 | <.0001* |
| Developmental Delay or Disability-Services Received | 211.73 | <.0001* | 9763.33 | <.0001* | 6700.97 | <.0001* |
| Child's Age at Kindergarten Entry | 1601.09 | <.0001* | 35.61 | <.0001* | 679.06 | <.0001* |
| Limited English Proficiency Status | 29.28 | <.0001* | 43.04 | <.0001* | ** | ** |

*Significant effect, p<.01

**Factor did not reach significance criteria to remain in the model for the particular educational outcome examined.

Table 4-3. Odds Ratios and 95% Confidence Intervals for Effects of Biomedical, Sociodemographic, and Educational Factors - Grade Retention, Special Education Placement, and Grade Retention and/or Special Education Placement

| Factor Levels | Reference Category | Grade Retention | Special Education | Grade Retention and/or Special Education |
|---|---|---|---|---|
| Maternal Race/Ethnicity | White | | | |
| Black | | 1.19* (1.14, 1.24) | .78* (.76, .82) | .99 (.96, 1.03) |
| Black Hispanic | | .84 (.66, 1.07) | .91 (.73, 1.13) | .84 (.70, 1.02) |
| White Hispanic | | .84* (.78, .90) | .90* (.85, .96) | .89* (.85, .93) |
| Other Hispanic | | .74 (.38, 1.44) | .49* (.27, .50) | .62 (.38, 1.00) |
| Haitian | | .73* (.64, .83) | .62* (.54, .70) | .67* (.60, .74) |
| Asian | | .66* (.55, .80) | .92 (.80, 1.06) | .83* (.73, .94) |
| Maternal Immigrant Status | US Born | | | |
| Non-US Born | | 1.49* (1.40, 1.59) | 1.16* (1.10, 1.23) | 1.30* (1.24, 1.36) |
| Maternal Education | Greater than High School | | | |
| Less than High School | | 3.30* (3.14, 3.49) | 1.03 (.98, 1.08) | 1.70* (1.63, 1.77) |
| High School | | 1.81* (1.73, 1.90) | .89* (.86, .92) | 1.10* (1.06, 1.14) |
| Maternal Marital Status | Married | | | |
| Single | | 1.10* (1.05, 1.14) | ** | 1.05* (1.01, 1.08) |

*Significant effect, p<.05

**Factor did not reach significance criteria to remain in the model for the particular educational outcome examined.

Table 4-3, Continued.

| Factor Levels | Reference Category | Grade Retention | Special Education | Grade Retention and/or Special Education |
|---|---|---|---|---|
| Maternal Age | 20-29 years | | | |
| Less than 20 years | | .89* (.85, .93) | .92* (.88, .97) | .93* (.89, .97) |
| 30-35 years | | .99 (.95, 1.04) | 1.15* (1.10, 1.19) | 1.11* (1.08, 1.15) |
| Greater than 35 years | | .87* (.82, .93) | 1.24* (1.18, 1.31) | 1.12* (1.06, 1.17) |
| Medicaid Recipient | No | | | |
| Yes | | 1.76* (1.68, 1.82) | 1.07* (1.03, 1.11) | 1.32* (1.28, 1.36) |
| Child's Sex | Female | | | |
| Male | | 1.74* (1.68, 1.80) | 1.77* (1.72, 1.83) | 1.81* (1.77, 1.86) |
| Birth Weight | 3000-4749 grams | | | |
| 0-749 grams | | 2.19* (1.53, 3.15) | 2.27* (1.54, 3.34) | 2.49* (1.71, 3.62) |
| 750-999 grams | | 1.78* (1.35, 2.34) | 1.22 (.90, 1.66) | 1.56* (1.18, 2.06) |
| 1000-1499 grams | | 1.41* (1.18, 1.69) | 1.10 (.91, 1.32) | 1.19* (1.01, 1.40) |
| 1500-2499 grams | | 1.53* (1.44, 1.63) | 1.16* (1.09, 1.24) | 1.33* (1.26, 1.40) |
| 2500-2999 grams | | 1.23* (1.18, 1.29) | 1.02 (.98, 1.07) | 1.11* (1.07, 1.15) |
| Greater than 4750 grams | | .87 (.69, 1.11) | 1.10 (.90, 1.35) | 1.06 (.88, 1.26) |
| Congenital Anomaly | No | | | |
| Yes | | 1.25* (1.08, 1.45) | 1.38* (1.20, 1.58) | 1.34* (1.18, 1.52) |

*Significant effect, $p<.05$

Table 4-3, Continued.

| Factor Levels | Reference Category | Grade Retention | Special Education | Grade Retention and/or Special Education |
|---|---|---|---|---|
| Developmental Delay or Disability – Services Received | None | | | |
| 0-3 years | | 1.19* (1.06, 1.35) | 1.86* (1.66, 2.09) | 1.59* (1.43, 1.76) |
| 3-5 years | | 1.58* (1.49, 1.68) | 42.24* (39.84, 46.92) | 27.70* (25.39, 30.23) |
| 0-5 years | | 1.12 (.98, 1.29) | 44.58* (37.33, 53.25) | 26.85* (22.23, 32.43) |
| Child's Age at Kindergarten Entry | 5.6-6.0 years old | | | |
| 5.0-5.5 years old | | 1.97* (1.91, 2.04) | 1.10* (1.06, 1.13) | 1.42* (1.38, 1.46) |
| Limited English Proficiency Status | No | | | |
| Yes | | 1.22* (1.13, 1.31) | .80* (.75, .86) | ** |

*Significant effect, p<.05

**Factor did not reach significance criteria to remain in the model for the particular educational outcome examined.

# CHAPTER 5
# DISCUSSION

Over recent years, the improvement of the educational outcomes of students in the United States has drawn a great deal of interest. Enhancing educational outcomes, and thus preventing adverse educational outcomes such as grade retention and special education placement, is an important goal when considering the associated short and long-term consequences. Specifically, studies have shown that adverse educational outcomes, such as grade retention and special education placement, are associated with high costs to the educational system, as well as a variety of negative consequences for students (i.e., increases in behavior problems, poorer social-emotional adjustment, high school drop out, less positive self-efficacy) (Byrd et al., 1997; Jimerson et al., 2002; Jimerson et al., 1997; Ochs & Rossler, 2001; Wood & Cronin, 1999). Furthermore, grade retention and special education placement lack support for their effectiveness in producing positive student outcomes (Byrd et al, 1997; Chambers et al., 2002; Jimerson et al., 2002; Kavale & Forness, 1999; Ochs & Rossler, 2001; West et al., 2000). When considering the aforementioned information, the need for the improvement of educational outcomes becomes unquestionable.

While improving the educational outcomes of students is clearly an important goal, the nature of the task is a complex one. There are many factors which influence student outcomes (Byrd & Weitzman, 1994; Gueorguieva et al.,

2001; Resnick et al., 1998; West et al., 2000), explaining why despite previous research and initiatives addressing the issue, a great need to improve student outcomes persists. The strength of the current study is the comprehensive consideration and evaluation of factors influencing the educational outcomes of grade retention and special education placement. Due to the availability of various state databases, which provided biomedical, sociodemographic, and educational information on students across the state of Florida, the role that a variety of factors play in the occurrence of educational outcomes could be simultaneously examined while controlling for a considerable number of potentially confounding variables. Additionally, as a result of the comprehensive consideration of factors, the highly complex nature of the issue could be more clearly and accurately illustrated. Study findings related to the impact of specific factors, as well as the overall complexity of the issue, have a number of specific implications for early intervention and other educational practices aimed at improving educational outcomes.

First, low birth weight showed one of the more powerful influences on subsequent educational outcomes. Children being born of weights falling in various low birth weight categories (i.e., 0-749g, 750-999g, 1000-1499g, 1500-2499g) were found to be at significantly greater odds, while controlling for other potentially confounding variables, of grade retention and/or special education placement by the second grade. These results add to the increasing research base showing the detrimental effects of low birth weight on various aspects of a child's educational development (Byrd & Weitzman, 1994; Mervis, Decoufle,

Murphy, & Yeargin-Allsopp, 1995; Taylor, Klein, & Hack, 2000; Taylor, Klein, Schatschneider, & Hack, 1999). Taken together, the findings of this study and existing research suggests that early intervention programs that currently are targeted towards children born of low birth weight who also possess other significant medical conditions provide services which are important in addressing their developmental needs and preventing adverse outcomes. In addition, the finding that low birth weight puts children at greater risk for adverse educational outcomes even when controlling for other variables such as developmental delay or disability, congenital anomaly, and poverty status suggests that children who are born of low birth weight but do not possess another risk factor also may greatly benefit from early intervention services. Currently, in the state of Florida, priority for participation in various early intervention programs, collectively known as the School Readiness Program, are given to children who either have an identified disability or are economically disadvantaged (Florida Senate, 2004). Presently, children who are born of low birth weight while not having an identified disability and not being economically disadvantaged do not have priority for participation in the School Readiness Program. Findings from the current study suggest that this subgroup of children may benefit greatly by also being given priority for participation in Florida's School Readiness Program due to their substantially increased risk for adverse educational outcomes.

In addition to the biomedical variable of birth weight, some sociodemographic variables were found to exert a significant influence on grade retention and special education placement. One significant sociodemographic

variable was student age. With regard to the impact of student age on educational outcomes, students who were younger (5.0-5.5 years versus 5.6-6.0 years) were at a significant and substantial risk for grade retention and a significant, but not substantial risk for special education placement. The significant and substantial risk of grade retention for younger students may be due to kindergarten retention practices. Kindergarten retention has been found to often be suggested for students perceived as needing additional time to develop due to difficulties they are experiencing academically or socially. A qualitative study conducted by Graue, Kroeger, and Brown (2003) found that parents, teachers, and administrators tended to perceive children who were younger at kindergarten entry as being at a disadvantage developmentally and lagging behind their peers physically, cognitively, and socially. Perhaps adding to perceptions that younger children need additional time to catch up with their peers, is the apparent escalation of the academic curriculum in the early childhood years of schooling due to increased accountability and academic standards in the educational system at large (Meisels, 1998).

Consistent with previous research, poverty status, as measured by being a Medicaid recipient during pregnancy, was related to significantly greater odds of grade retention and special education placement, though the effect of poverty on special education placement was not substantial. While the effects of poverty on special education placement may not be as large as some other variables (i.e., birth weight, services for developmental delay or disability), there are a larger number of students affected by poverty as compared with other factors such as

birth weight. Furthermore, children living in poverty are more likely to be exposed to a variety of conditions which put them at greater risk for a variety of problematic outcomes (Donovan & Cross, 2002; Borman & Rachuba, 2001). For example, children living in poverty are more likely to be born of low birth weights, receive inadequate nutrition, lack appropriate immunizations, have health problems which go untreated, and lack material resources (Child Trends, 2001; Holloman, Dobbins, & Scott, 1998; St. Pierre & Layzer, 1998). Due to their higher risk of experiencing adverse educational outcomes, along with the multiple adverse conditions to which children living in poverty are exposed, the importance of comprehensive early intervention programs such as Head Start cannot be underestimated. Additionally, continuing research and research funding to improve the early intervention services provided to children living in poverty is necessary to further enhance the educational outcomes of these children.

Related to the significant impact of poverty on educational outcomes, is the lack of significant effects or significant but not substantial effects of race/ethnicity on educational outcomes. Researchers have noted that a greater proportion of minority children live in poverty when compared to their non-minority counterparts (Donovan & Cross, 2002). This study controlled for poverty along with a variety of other factors (e.g., low birth weight, lower maternal education) associated with poverty. As a result, the increased risk sometimes associated with race/ethnicity in other studies was not found in the current study. This finding provides some support to the idea that it is other factors, such as poverty or low

birth weight, that occur more often in some racial/ethnic groups that contribute to adverse educational outcomes rather than race/ethnicity itself.

In addition to the above findings, a differential pattern of grade retention and special education placement was found for students of different racial/ethnic backgrounds. Specifically, students of black and Haitian backgrounds were found to have similar percentages of students within their subgroups experiencing grade retention as compared to special education placement. On the other hand, all other racial/ethnic groups had higher percentages of students experiencing special education placement as compared with grade retention. Additionally, a greater percentage of black students experienced grade retention as compared with other racial/ethnic groups (e.g., 21% of black students retained versus 13% of white students retained). With grade retention likely being indicative of those students considered as making inadequate educational progress, the higher percentage of black students experiencing grade retention may be a reflection of the well-documented achievement gap that has existed between white and black students for many years (Haskins, 2004; Singham, 1998 as cited in Bainbridge & Laisley, 2002; Uhlenberg & Brown, 2002). Currently, school accountability initiatives, such as No Child Left Behind (NCLB), are being used as a means for ameliorating the apparent achievement gap (Fusarelli, 2004). However, some suggest that accountability initiatives which place their primary emphasis and focus on schools and students will likely be insufficient to fully address the issue of the achievement gap (Fusarelli, 2004; Giroux & Schmidt, 2004; Hunter & Bartee, 2003).

The issue of the achievement gap is more complex than higher standards, better teachers, and more testing. Just as the findings of the current study indicate that educational outcomes are affected by a multiplicity of factors that span different domains (i.e., health, social, educational), a considerable number of factors also spanning different domains have been cited as influencing the achievement gap. For example, low socioeconomic status and its associated health and social conditions, quality of academic instruction, stereotype threat, out-of-school experiences, parental understanding of school culture, and parental level of education, are just some of the factors that have been cited as influencing the achievement gap (Bainbridge & Laisley, 2002; Hale, 2004; Roach, 2000; Rothstein, 2004; Talbert-Johnson, 2004). The substantial number of factors that have been cited as potentially influencing the achievement gap, and the considerable impact that poverty may have, suggests that if any real improvement is to be seen with regard to the achievement gap, a comprehensive initiative, which includes the schools, but also emphasizes other domains (e.g., health, economic) is necessary. In fact, the often cited decrease in the achievement gap during the 70s and 80s, (Hunter & Bartee, 2003; Ipka, 2003; Jacobson, Olsen, Rice, Sweetland, & Ralph, 2001 as cited in Talbert-Johnson, 2004), is suggested by some to have been a result of more comprehensive policies during that time period which attempted to improve the achievement gap by not only bringing attention to the schools, but also emphasized the broader based societal issues (i.e., economic disparities, civil rights issues) that contributed to the gap (Hunter & Bartee, 2003). Rothstein (2004) has suggested

that to make substantial improvements in relation to the achievement gap, 3 different areas must be simultaneously addressed: improve the quality of schools; improve students' out of school experiences, including early childhood programs and after school and summer experiences; and creating social and economic policies (e.g., development of health clinics, provision of stable housing, aggressive anti-discrimination policies, wage increases) which promote children's development. Until the complex realities of the achievement gap are again accepted and addressed in a comprehensive manner as was done in the 70s and 80s, it is unlikely that significant decreases in the achievement gap will be observed.

Also related to issues of diversity and academic achievement, are study findings showing that limited English proficiency led to a significant risk effect for grade retention and a significant protective effect for special education placement. While these effects were not of substantial magnitudes, they are in the opposite direction, suggesting that grade retention is used more often than special education placement as a means for intervening with English Language Learners when academic concerns are present. Additionally, the significant protective effect for special education placement raises questions about whether English Language Learners are making needed academic progress so that they are less likely to experience the adverse outcome of special education placement, or if those who are not making adequate progress are not being identified as in need of special education services due to the complex nature of identifying academic needs in children who are linguistically diverse. Similar to

concerns raised by other researchers (e.g., Connor & Boskin, 2001; Ortiz, 2001), the current study findings raise questions about the manner in which, as well as the degree to which, the academic needs of English Language Learners are being appropriately addressed.

Another important finding of this study is the critical influence of maternal education on children's educational outcomes. Maternal education was shown to have the most powerful effect on grade retention by the second grade. Specifically, children of mothers with less than or equal to a high school education were shown to be at substantially greater odds of being retained in grade as compared with children of mothers who had greater than a high school education. These findings along with other research highlighting the importance of maternal education (e.g., Hollomon, Dobbins, & Scott, 1998) suggest that keeping young mothers in high school, as well as providing alternative education programs for mothers of all ages is a vital and potentially necessary component of any attempts to improve children's educational outcomes. Currently, there is a large federal initiative, the Even Start Family Literacy program, that attempts to address this need (Yaffe & Williams, 1998). The Even Start program was developed specifically to improve educational opportunities by providing coordinated services in the areas of: early childhood education, adult basic education, and parenting education (Florida Partnership for School Readiness, 2004). Examples of specific services provided to those participating in Even Start include: adult basic education/GED instruction, adult literacy education, job training, daily living skills education, parenting education, individual and family

counseling, social service referrals, childcare, and intergenerational activities (Ponzetti & Dulin, 1997; Yaffe & Williams, 1998).

According to the United States Department of Education, families who participate in Even Start make consistent annual progress in relation to measures of literacy. Despite the gains that are observed, a recent evaluation of the Even Start program (see St. Pierre et al., 2003), showed that the progress of participating families did not exceed that of a control group. It should be noted that the control group included families who had reported receiving other early childhood or family literacy services (USDOE, n.d.). Additionally, the study also found that the greater the intensity with which parents and children participated in specific program services (e.g., early childhood education, parenting education), the higher the scores children obtained on measures of literacy (St. Pierre et al., 2003).

While Even Start is one of the largest initiatives attempting to address the factor of maternal education, in recent times the existence of program was in danger. In particular, in the 2005 budget proposed by the White House, the Even Start Family Literacy Program was recommended to be eliminated (Denardo, 2004). Despite this recommendation made in the 2005 budget, the House of Representatives Appropriations Committee voted to fund Even Start fully (National Even Start Association, 2004). With maternal education being such an important and influential factor in children's educational outcomes, one wonders how notions of eliminating programs such as Even Start could even be entertained. It is acknowledged that a recent evaluation (St. Pierre et al., 2003) of

the Even Start program lacked compelling support with regard to program effectiveness. However, given the importance of maternal education to educational outcomes, it could be argued that greater emphasis and support should be directed towards improving the effectiveness of the Even Start program and participation in the program, as well as further developing and expanding other family literacy programs. To eliminate or deemphasize initiatives aimed at addressing the highly influential factor of maternal education, is to essentially ignore an important piece of the educational outcomes puzzle.

Finally, previous research studies have demonstrated the positive impact that early intervention programs can have on student outcomes (Campbell & Ramey, 1994; Conyers et al, 2003; Plecki, 1995). While providing more general information about the relationship between specific early intervention services and educational outcomes, the current study also revealed some encouraging results with regard to the effects of the early intervention services examined. More specifically, an examination of the descriptive statistics shows that less than 50% of children who received services through the Early Intervention Program (EIP) from birth to 3 years old went on to experience either of the outcomes of grade retention or special education placement by the second grade. While an evaluation of the odds ratios for children who received EIP services from birth to 3 years old still showed these children to be at increased risk for grade retention or special education, the risk and percentage of children experiencing these educational outcomes are decreased from what might be

expected as all children enter the program because they possess or have a condition associated with a developmental delay or disability.

In contrast to the children who received EIP services from birth to 3, approximately 90% of the children receiving Pre-Kindergarten Children with Disabilities (PKCD) services from ages 3 to 5 or receiving EIP and PKCD services from ages birth to 5 went on to experience grade retention and/or special education placement. Children who received services from the ages of 3 to 5 years old were at a significant and substantial risk for grade retention and special education placement. It is difficult to make any firm conclusions as to why receiving services from the ages of 3 to 5 was associated with such substantial risk of both grade retention and special education placement. There are likely a variety of factors that influence the effectiveness of services and the ability to measure the effectiveness of services, such as the nature of the students' delays or disabilities, the time period of services, and type of services provided (Plecki, 1995), that may have contributed to the findings.

In contrast to the previously mentioned finding, children who received services from birth to 5 years old were not at a significant risk for grade retention, but were at a significant and substantial risk for special education placement. It is likely that children who were in need of early intervention services from birth to the time they entered school have considerably more significant developmental delays or disabilities than those children who solely received services from ages birth to 3 or from ages 3 to 5. As a result, it is probable that these children would experience continuing developmental difficulties and possess special needs upon

their entry into school, which likely contributes to their increased risk for special education placement. Given the significant needs that are likely present in this population, the continuity and availability of early intervention services to address their various needs becomes paramount.

Perhaps the most striking and important implication of this study can be found through a more global evaluation of the findings -- preventing the adverse educational outcomes that affect a substantial percentage of students (approximately 30% in this study), is a highly complex issue. Results of the current study showed all factors considered to have significant effects on grade retention and/or special education placement. These factors span various life domains (i.e., health, social, economic, educational), and some are present very early in life (i.e., low birth weight, congenital anomaly, poverty status). When considering these findings, two major recommendations related to the development and/or implementation of initiatives to improve educational outcomes can be identified. First, due to the large percentage of students experiencing adverse educational outcomes and multiplicity of factors that influence educational outcomes, initiatives must be comprehensive in nature and scope to have a positive impact. Next, considering that some risk factors are present very early in life, early intervention programming is a vital component to any initiative aimed at enhancing educational outcomes.

With regard to the nature and scope of initiatives to prevent adverse educational outcomes, the large percentage of students experiencing adverse educational outcomes and considerable number of factors influencing outcomes

suggests that neither early intervention programs, nor public schools and the associated school accountability efforts, nor the medical community can tackle the issue of improving student outcomes alone. Increased and improved collaboration between early intervention programs, public schools, and the medical community, as well as the sharing of current knowledge and research between service providers may assist in making the greatest impact on students' educational outcomes. For example, due to their early and ongoing contact with young children, pediatricians may be highly instrumental in identifying and referring children who may benefit from the receipt of early intervention services. Creating and improving partnerships and referral processes between early childhood programs and pediatricians throughout the community could enhance and assist with the earlier identification of children in need of specialized services. Notably, a recent commentary in the medical literature highlights the importance role of pediatricians and others in the identification and referral of children to early intervention programs (Zuckerman & Halfon, 2003). Additionally, a recent study examining pediatricians' referral practices in relation to Head Start suggests some improvements could facilitate the referral process. For example, results of the study suggested that the use of an automated process for completing an application to send for a referral to Head Start, would increase the likelihood of referral being made from pediatric clinics (Silverstein, Grossman, Koepsell, & Rivara, 2003).

Greater collaboration between service providers would likely also increase the comprehensiveness of services provided to students, which is likely required

to substantially impact educational outcomes due to the number of factors spanning various domains that influence outcomes. While early intervention programs (e.g., Head Start, Even Start) tend to provide a broader scope of services, after children leave early intervention programs and enter school, these comprehensive services may not be as readily available (i.e., healthcare, parent education programs). While access to services as children grow older may become more challenging, the effects of risk factors such as poverty and medical conditions remain. Facilitating collaboration and creating connections between public schools and the more comprehensive palate of services often found in early childhood settings may assist in the improvement of educational outcomes. For example, having individuals within public school settings who can assist families with limited financial resources with accessing health care insurance and medical services for their children is one way to address those health-related risk factors that also affect student's educational development. Additionally, extending opportunities to participate in family literacy programs not only during the early childhood years, but also as children grow older is another means of more comprehensively addressing factors influencing educational outcomes.

In relation to the vital role of early intervention, a variety of points can be made. First, while early intervention programs cannot reasonably be expected to prevent all problems of all children, such programs can be highly instrumental in efforts to improve the educational outcomes of students (Casto & Mastropieri, 1986; Gorey, 2001; Guralnick, 1997; Shonkoff & Phillips, 2000), particularly if used in combination with other efforts as described above. Early intervention

programs are in the unique position of having the opportunity to provide targeted services to enhance student development *prior* to the occurrence of adverse educational outcomes. This prevention of outcomes as opposed to attempts at remediation of outcomes likely has benefits for the student, as well as monetary benefits to the educational system and society in general (Barnett, 1995; Campbell et al., 2001; Reynolds et al., 2002). In her discussion related to the achievement gap, Hale (2004) clearly illustrates the importance of educational outcomes early to a student's overall development. In her commentary, she related that while at a conference, attendees were startled to learn that the local prison was able to accurately predict how many prison cells they would require by identifying the number of local public school students reading below grade level in the second grade (Williams, 2002 as cited in Hale, 2004). While research tells us of the benefits (e.g., higher graduation rates, decreased rates of out-of-wedlock births, increased work earnings, decreased reliance on social services, and decreased juvenile arrests) of promoting children's development through early intervention, Hale's example clearly illustrates the stark reality of the issue. (Barnett, 1995; Gorey, 2001; Reynolds et al., 2001; Schweinhart, Barnes, & Weikart, 1993).

In addition to the aforementioned recommendations for the improvement of educational initiatives, some more specific observations and recommendations can be made with regard to school accountability efforts. Specifically, many of the factors (i.e., birth weight, maternal education, poverty, developmental delay or disability) found to be associated with adverse educational outcomes are

present long before children enter kindergarten. The presence of such factors early in a child's life raises serious questions regarding the degree to which schools should be held accountable for a child's educational outcomes. For example, the current school accountability system in the state of Florida (FDOE, 2001, 2002c, 2003b) holds schools accountable for student performance and outcomes at the primary and secondary levels, without consideration of factors present early in childhood. If factors present early in life influence student outcomes, how can a school's contribution to improved outcomes be accurately evaluated without consideration of these other factors? This question is important to consider, especially given that schools often do not have control over some of the factors influencing student outcomes.

To improve the accuracy of school evaluations completed as part of state accountability systems, information about early childhood factors that have been shown to have a substantial influence on educational outcomes should be incorporated into school evaluations. Study findings show that there are three major categories of factors – biomedical, sociodemographic, and educational - that have an impact on a child's educational outcomes and should be incorporated into accountability evaluations. Furthermore, it should be acknowledged that the number and percentage of students who possess various factors identified as influencing educational outcomes is likely to vary greatly from school to school or from year to year within one school. For example, one school may have a high percentage of students who were born of low birth weight and were identified with a developmental delay or disability young children

while another does not. Again, to accurately assess the impact that specific schools have on the educational outcomes of the specific population of students they serve, inclusion of information related to the factors experienced by the students comprising a particular student population should be included in accountability evaluations.

All in all, the current study clearly illustrates that the improvement of educational outcomes is a complex issue requiring complex solutions. Just as with the persistent achievement gap, substantial improvements in the educational outcomes of America's students will likely remain unseen until the intricate realities of the issue are fully acknowledged, and the realities that are acknowledged are seriously addressed.

**Study Limitations**

While the current study provides a more comprehensive and thorough examination of factors potentially influencing educational outcomes than was previously available in the research literature, some limitations of the study can be identified. First, due to the lack of access to birth and early intervention data for students who were born outside the state of Florida, this study provided an examination of the early educational outcomes of only those students who were born in the state of Florida. As a result, the findings of this study are only generalizable to the population of students who were born in Florida and subsequently entered public schools in the state of Florida. Thus, there is a subgroup of students (i.e., non-native Floridians) who attend Florida schools for which the likelihood of various early educational outcomes should be examined.

Next, the current study utilized data to measure services received for developmental delay or disability which was collected and aggregated at the state level. In effect, the information collected provided general measures of the services received (i.e., services received yes/no), without specifying the particular nature (i.e., types, intensity, duration) of the services received. Additionally, within the variable of services received for developmental delay or disability, the specific types of needs for which children were receiving services was unavailable. Also, no information was available on whether children received other additional services beyond what was noted in the state dataset such as Head Start services, non-governmental early childhood services, or developmental services provided by a private practitioner. Due to the general measures associated with the services received for developmental delay or disability variable and difficulty identifying whether these children received other additional services, only general conclusions regarding the effects of these services on early educational outcomes can be made.

Finally, a limitation to the understanding of the outcome of special education placement is that the outcome was not examined in relation to disability category, but by whether a student received special education services or not. The need to look at special education placement as a dichotomous outcome was related to the lack of sufficient sample size to further break down the variable by specific disability category. While special education placement was not examined by disability category in the current study, previous research

suggests that predictors of special education placement may vary by type of disability (Resnick et al., 1998).

**Directions for Future Research**

The current study provides a more comprehensive understanding of the effects of various factors on early educational outcomes. However, much more research is needed to reach the goal of improving the educational outcomes of students in the state of Florida and in the United States. Specifically, findings which show low birth weight to be independently associated with grade retention and special education placement suggests that research should further address the nature of the relationship between this medical condition and a child's academic development. Particular lines of research in this area may include evaluating the effects of providing early intervention services to children who were born of low birth weight, but do not possess another significant medical condition. Concerns have been raised in the literature on student diversity regarding paucity of research examining how a child's linguistic background affects placements decisions (Connor & Boskin, 2001). The current study found a significant risk effect for children identified with limited English proficiency for grade retention while a significant protective effect was found for special education placement. While the aforementioned findings provide some information regarding the relationship between linguistic background and placement decisions, additional research is needed to more clearly identify how linguistic background is related to placement decisions and adverse educational outcomes, as well as how to increase positive educational outcomes and meet the unique needs of this population of children. Related to issues of student

diversity, differential patterns of grade retention or special education placement were found among students of black or Haitian backgrounds as compared with students of other racial/ethnic backgrounds, as well as among children of mothers with lower maternal education and lower maternal age as compared with mothers with higher educational levels and older maternal age. Future research should more systematically explore the observed differential patterns of grade retention and special education placement among these subgroups of students. Lastly, while some general findings in the area of services received for developmental delay or disability are presented through the current study, more research should be done in this area. In particular, identifying how the nature, timing, and intensity of services affect the educational outcomes of children with various types of developmental delay or disability may be an important line of research.

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I certify that I have read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the degree of Doctor of Philosophy.

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